

The Commercial Car Journal

VOLUME XXII

PHILADELPHIA, OCTOBER 15, 1921

NUMBER 2

How Many Trucks in Your Territory NEED

WINTER EQUIPMENT?

This Article Tells How to Analyze Your Market; How to Sell Winter Equipment on a Service Basis and Why the Sale of Equipment Leads to New Truck Sales

ARE YOU GOING TO GET YOUR SHARE OF THIS BUSINESS?

By C. P. SHATTUCK

AN Eastern truck distributor has evolved a plan for keeping his sales force 100 per cent active and for building a prospect list. This dealer was averse to reducing his sales force—for he had developed a fine organization—but was aware that one or two salesmen were becoming discouraged, because their earnings fell below those of normal times. Conditions also demanded some method of retrenchment during the fall and winter months, but, being loath to drop men he decided to open a new department. In other words, he planned an intensive educational and sales campaign to sell his own customers, and others, that Equipment and Supplies are essential to the motor truck in cold weather.

Profits and Advantages of Campaign

This is not the first time the Commercial Car Journal has advocated the merchandising of winter Equipment and Supplies, but heretofore the average dealer has been too busy selling trucks to seriously consider the profits and advantages of the plan. But in these days the average dealer cannot afford to overlook any opportunity to make a dollar or any plan that will keep his organization intact for the day when the truck industry comes into its own.

The writer holds no brief for the type of dealer—big city or small town—who thinks he cannot sell supplies and equipment to the truck owner, because of the stock of supply house. Repeatedly, dealers have told me that there is no

money in it. Some say that the cut price supply house bars competition. But, they are wrong and a little analysis will prove my contention.

Potentiality of Market Immense

The established truck dealer will find that if he compiles a list of customers, plus the supplies and equipment needed on their trucks reasonable percentage of sales to these will yield him a very neat profit with a very small overhead and investment.

Figures might be quoted to indicate the number of trucks in service, but such statistics, unless applied to each dealer's territory, would merely indicate generalities. Such figures when used are apt to reflect the mental attitude of a mechanic who invented an accessory for a flivver. He figured that he could make a profit of \$1 on each sale—there were millions of flivvers—and he would become a multi-millionaire over night. But he didn't. He didn't know how to estimate his real market.

Coming back to the second angle, competition with the cut price house, the writer contends there would be little if any competition, if the dealer would merchandise on a service basis, not on price. It is contended that the truck owner will not pay \$1 for a spark plug, or \$4 for a set to the truck dealer when the owner can purchase them at 79 cents each at a supply house. He saves 84 cents, say the dealers, and 84 cents is worth saving. But the cut price supply house does not install

the plugs, neither has its salesman any interest in the purchaser other than making a profit. And I ask the very pertinent question, does the cut price supply house sell the owner the plug he should use, or one the supply house pushes, because of the profit therein?

Selling Service Means Results

Regardless of whether the sale involves a spark plug, jack, tire chains, primer, heater, or windshield cleaner, the writer contends that the cut price supply house salesman is not qualified—either by experience or technical knowledge—to know whether the particular article that he sells is best adapted to the particular truck. Neither does the supply salesman know whether his article will be the cheapest and best in the long run. Nor does he know, or care for that matter, what the cost of installation will be. This may appear a severe criticism of the cut rate supply house, but a dozen cases could be quoted to sustain these contentions, but one will suffice. An owner of a truck, who also drives, found a windshield cleaner very essential so attracted by a cut price supply advertisement, purchased one. He was assured by the salesman that it would fit the truck; in fact, the salesman very glibly explained how it could be attached. But when the purchaser attempted to attach it he discovered that it involved considerable work. There was, he found, another cleaner on the market that could be quickly and easily attached, so he gave away the first

cleaner and purchased the right model. **How much did it cost this owner** for his cleaner? The point is this: had the owner consulted the dealers' service station, and had the latter been selling or advising truck equipment, the owner would have been saved time and money.

Service Must be Merchandised

It may be contended, and rightfully so, that the greater percentage of the truck owners will not consult the dealer, his salesmen or service station when in need of equipment or supplies. Supplying the truck owner therefore means intensive sales effort, education and advertising on the part of the dealer. The equipment cannot be sold by merely stocking it, placing it on shelves and sending out a few circulars. Trucks are not sold that way, at least not in these days. They require real selling and so do supplies and equipment. Some

force was requested to make an analysis on forms which were supplied for the purpose.

Analyzing the Market

On these forms various items were checked up, such as the name of purchaser, date, capacity of truck, body, tires, equipment, etc. The industry in which the trucks were used was also indicated. Similar forms were supplied the service station and the inspectors. Instructions were given to obtain data as to how the trucks were used; i.e., the mileage per day; routes; goods transported; what equipment is used; its condition; etc. The service station was requested to make a report on the condition of each chassis; body; equipment; etc.

In the meantime the dealer held conferences with the service head and foreman, and occasionally a mechanic was called in. The dealer smiled when quizzed

in work where efficient lights are essential to safe and economic transportation.

"About 71 per cent are not equipped with tire chains or other form of traction device. Over 92 per cent make no provision for the comfort of the drivers; that is, have no heaters. About 60 odd per cent are not equipped with suitable cabs or enclosures, or curtains protecting the driver against stormy weather or cold. One hundred per cent are not stocked with any anti-freezing solution. Over 90 per cent have no windshield cleaners and a similar per cent are not equipped with radiator cover or hood cover. The survey shows a big market for tire replacements to say nothing of priming devices, odometers, lenses, gloves, etc.

Merchandised on Service Basis

"We are not going to sell these articles but we are going to sell service. That is



WHICH ONE OF THESE FELLOWS ARE YOU?

dealers are doing it and it is a good bet that more will be before the snow flies.

How it can be done is explained by the sales plan of the dealer previously referred to in this article.

The first thing he did was to sell his organization. He called a meeting of the sales force, (retail and wholesale) the service head and the foreman of the service station. The dealer opened the conference by asking those who thought it practical and profitable to merchandise Winter Equipment and Supplies to stand up. Just three arose, one salesman, the service head and the foreman. Those not in favor of the plan were asked to give their opinions and they were, said the dealer "the usual objections, the cut rate house; supply stores; etc." The service head wanted to talk, but was silenced by the dealer who closed the meeting with the remark that a second meeting would be held shortly. In the meantime each one of the sales

by any of the sales force, but answered no questions. A meeting was called when the survey was complete and the dealer addressed his force somewhat along these lines:

Selling the Organization

"At the previous meeting only three believed in the possibilities of merchandising equipment and supplies for trucks. I have some figures here compiled from our records and your investigations. To August 31 we have sold 1,021 trucks of which number 450 are in the retail territory and 571 are wholesale or in our associate dealers territory. Records for 1921 are not quoted. Of those in the retail territory, 90 per cent or 385 trucks are not equipped with headlights or are in need of replacements and repairs. A detailed analysis will be supplied to each one later. Approximately 50 per cent of these trucks can be sold lighting equipment as they are engaged

the fundamental basis of the campaign. We have allowed a profitable business to go begging, to be snapped up by the passenger car supply and accessory houses, because we have been too busy selling trucks. The motto of this house from now on is **selling service**. Our policies will be directed along these lines from now on and hereafter. No customer, new or old, is going to be allowed to seek that service we should render.

"Did it ever occur to you, gentlemen, that contact with your customer, having his confidence in your house, in the product it sells and its service, are the most valuable assets in sales? As salesmen, you know that the real profits, your bread and butter, are derived from the satisfied customer—the repeat order! A certain manufacturer of passenger cars has adopted a sales slogan. 'What comes after the purchase price?' The answer is service, and service may be interpreted to mean 'that

low maintenance cost through service that satisfies the owner."

"Our campaign provides for co-ordinating the sales and service departments and the latter will be indirect salesmen. They will educate you gentlemen and teach you how to sell. You are not going to a customer to peddle supplies and equipment, but you are going to sell the customer on a service basis. For example, I have here a report that the Brown-Williams Company operates five of our 2-ton trucks and that deliveries are made in suburban and country districts of its products. Its drivers work until six at night and frequently do not return to the garage until as late as nine. None of the trucks have other than oil lights. Can this company be sold suitable lighting equipment? No, it cannot, but it can be sold, and will be, by selling the service the lights will render.

Making an Analysis of Lighting

Mr. Meyers, our service head, conducted a novel experiment and it should supply you with a selling idea. He cultivated the driver of a truck and the superintendent of the company. Meyers made a trip or two with the driver, noting deliveries, route, time, etc. He found that the driver lost time by having to proceed carefully on roads not lighted. With my approval Meyers installed a pair of acetylene headlights and a tank. The result was that that truck cut down its own time to a remarkable extent, to say nothing of conserving the driver's energies. I am pleased to state that Meyers has taken an order to equip all five trucks and the profits are very satisfactory. Meyers gets a commission for his sales.

"He sold on a service basis which after all is a saving to the customer, because it increases the efficiency of the trucks and the drivers. In other words, Meyers analyzed conditions and sold service, not lights. Practically the same service sales methods are to be applied to heaters, primers, chains, cabs, curtains, windshield cleaners, etc.

Investigating the Products

"We are making an investigation of these products, a most complete one. We will adopt those which have proven the most satisfactory to our trucks and which can be installed with the least probable cost to the customer. We will not handle any line, no matter how attractive the profit, unless it is the best service to our customers. Products will be submitted to our service department and a flat rate of cost of installation determined, and where feasible and practical, the price of the article will include installation. Furthermore, you will be supplied with facts and figures. You will be grounded in the operation and advantages of each device and the service station head will conduct an evening school to teach you gentlemen what each device is, how it functions; all of which will be good sales ammunition for you.

"Each salesman will be given a list of prospects. Most of these will be his old customers. It will be to your advantage to maintain contact with your clients, for it will mean truck sales in the future. Your efforts will not be confined to our trucks, but to sell owners other makes as

well. This will, I believe, augment your prospect list, to say nothing of giving an entree to these owners. Owners of competing trucks are to be sold on the service basis which will give you an opportunity, if nothing else, to merchandise our service.

Building the Prospect List

"Prizes are to be offered all employees, except the salesmen, who supply the greatest number of prospects. The plan is very simple and consists of using one's eyes on the streets, country roads and when calling on the trade. Simply note the name, address and license number of every truck not having lights, hood covers, windshield cleaners, etc., and turn in the report to the sales department. Why there are hundreds of prospects in plain sight every day! A big distributor of lighting equipment in New York obtains the bulk of his prospects and business in this manner. Prizes are to be offered each department including the repair shops. Notice is also hereby given that Henry Cline is transferred from the repair shop to the sales force and will merchandise winter equipment and supplies. His knowledge is available to any member of the sales force who desires it.

Displays and Advertising

"The campaign will include a vigorous advertising schedule with some real snappy copy. Winter equipment will be displayed in the sales room on trucks and in windows. The demonstrating trucks will be fully equipped and labeled with suitable advertising signs. The wholesale men will educate and train our associate dealers and we will supply, if desired, the material and products to our dealers, so that standard equipment will be used throughout. Commissions will be paid on sales and the percentage will, I believe, be an attractive one. Any remarks?"

There were, of course. One salesman said he would starve if he relied on the profits selling equipment. In reply, the dealer remarked that the campaign was an accessory to the fact and that the fact was selling trucks. "If," argued the dealer, "you convince the prospect you

are not selling him equipment, but real service, will it not establish a contact with the prospect, and will not a continued contact lessen sales resistance when the prospect is ripe for another truck? Putting it another way, will not your calls convince the prospect that you are interested in seeing that he gets the best from his trucks and that you are interested in his welfare even after a sale?"

Another salesman desired to know if the campaign included merchandising spark plugs, tires and other products which the owner might wish to buy direct.

"Yes," replied the dealer, "the greater number of articles named are to be merchandised and to offset the price question, we will sell a service which may not be highly profitable, but will be the means, I think, of educating the customer to rely upon us for advice where such articles are to be used.

"It may interest you to learn that we are considering a service plan whereby ignition, battery, lighting and starting equipment will be serviced by us direct, eliminating sending customers to service stations. Details of the plan, if adopted, will be made known later. We have concluded that to properly service the product we represent, we must supply service and not drive our trade outside, thereby losing contact with both the driver and the owner. In so far as practical a similar plan will be developed among our associate dealers. Those in favor of our winter campaign please stand." All arose.

What this dealer is going to do can be done by every live wire dealer who must realize the vital need of making a dollar and rendering service to his customers, not only now but when the salesmen flourish as of yore. An analysis of your market will reveal exceptional possibilities. There can be no real competition where the merchandising plan is based on service, for, as previously pointed out, the cut rate supply house lacks knowledge of the practical requirements of motor highway transportation and also that desirable factor, contact with the truck owner and user. Let's go.



Rapid Transportation Finally Supplants Foot Travel in Canton, China

With the reconstruction work instituted a few years ago, Canton, China, has made a definite step forward in the establishment of motor truck transportation. Upon the recent completion of an extensive urban street-remodeling program, designed to accommodate modern motor traffic, a bus line was inaugurated for the city transportation. This line operates 15 FWD trucks, manufactured by the Four Wheel Drive Auto Co., Clintonville, Wis. The trucks are equipped with bodies of Chinese make and each truck hauls a trailer which is similarly equipped. One unit, consisting of a truck and trailer, has a seating capacity of 70 persons. Service is provided the populace of the city 15 hours of the day to any part of the city of Canton.

“Better Business is at Hand”

M. & A. M. A. Members See Rapid Improvement in the Automotive Industry. Prices Have Reached a Sound, Normal Basis

THAT Better Business is at hand and that a bigger era of prosperity than ever before realized is in store for the automotive industry, was the keynote of every address made before the Fifth Annual Credit Convention of the Motor and Accessory Manufacturers' Association, at Detroit, Sept. 14th to 16th. One thing is certain, that the two hundred or more members present left that meeting with a firm belief that the automotive business has struck the upward curve, and that from now on it will increase gradually, though not very rapidly. There wasn't a pessimistic note voiced during the whole meeting, and every speaker brought further evidence that the turn has come and that the hard working element in the industry is going to make the future better and bigger than ever the past has been.

During the entire meeting a spirit of co-operation was manifested which indicated the desire on the part of the parts manufacturers as a whole to render a service to the automotive buying public which in the past has somewhat been neglected. Although the service question was not a part of the program, statements made by various speakers indicated that the future of the automotive industry depends not alone on price and the sales ability of the dealer and manufacturer, but upon the consideration the owner receives after the sale has been consummated.

Live and Let Live

In an open discussion on the credit situation, the question arose whether or not the members of the M. & A. M. A. should take matters in hand and clamp down the lid on concerns who during the past year have been unable to extricate themselves from their financial difficulties. The opinion was voiced, that many concerns have had ample time to make restitution but have not as much as paid off a dollar on their indebtedness. Wouldn't it clear the slate for many parts and accessory manufacturers if drastic action was taken immediately against those vehicle builders?

Contrary to expectation, however, the members unanimously agreed that such action would not remedy matters. On the contrary it was contended that such a procedure would tend to disorganize and lower the moral of the industry and force some concerns to the wall which otherwise will come through successfully with the better business conditions which are noticeable every day.

The manufacturers as a whole feel that it would be policy to give those manufacturers who really are trying their best to get back on their feet, a further chance to make good, but a strong feeling of

resentment against the “fly-by-nights” was displayed.

This meeting was incidentally the best the association ever held, both from a standpoint of attendance and in the variety of subjects dealt with by the speakers. Hardly a phase of the industry's activities was passed without bringing forth some instructive suggestions or comments.

The following paragraphs will give our readers a review in brief of the statements made and subjects discussed at this convention:

1913 is “Last Year”

J. P. Harris, vice-president of the Union Trust Co. of Cleveland, stated that “to you in this industry, 1913 is ‘last year’—the last business year you should figure. The quicker your industry realizes this the better it will be for all.”

He stated that the supply of credit the world over is now above normal, the bear market is over and that securities are going up.

J. H. Collins, Manager, Commercial Research Department, Chilton Co., proved his contentions from figures on production, export, import and increase in registrations, that it will not be many years when the entire factory equipment of the industry as it stands today will be needed to build cars for the replacement alone of cars going annually out of use in this country. This statement was based on six years as the average life of a car.

Harry G. Moock, general manager of the N. A. D. A., gave the convention the dealers' side of the picture. He outlined the progress made toward getting factory and dealer together on a better plane of understanding.

His recital of what had been accomplished in sending out lecturers demonstrating the correct service of well known units was listened to with interest and several manufacturers will take advantage of this opportunity when this traveling school idea is started again this winter.

Salvation Lies in Sales

Credit matters took up the greater part of the second morning session. George J. Johnstone told of the work of the association's credit grading committee, and C. H. Dickerson, vice-president of the Timken-Detroit Axle Co., gave a masterly presentation of “Credit Policies Under Present Conditions.”

“Paradoxical as it may seem,” said Mr. Dickerson, “credit dealt the industry a bad blow, and only through credit will it recover.”

After pointing out present business conditions he said that anyone contemplating going into this business today had better

figure all contingencies and then add 100 per cent to his estimate.

Salvation of the industry today lies in sales, and he urged every possible energy be employed along this line.

The personal equation in granting credits was summed up by A. H. D. Altree, vice-president of the American Bosch Magneto Corp., in the following:

“Does the man asking credit look you squarely in the eye, and would you lend him your own money?”

Theodore H. Price, editor of “Commerce and Finance,” of New York, gave a masterly presentation of the development of civilization through the use of the wheel, and saw nothing but a greater and better automotive industry in future.

No one voiced the sentiment of co-operation more strongly than H. H. Rice, president of the Cadillac company, who was the final speaker on the opening day, and who came as the representative of the N. A. C. C.

“The tide has turned,” said Mr. Rice. “There is no occasion for too much optimism, but there are many minor indications and sufficient straws to show that the trade winds are blowing in the right direction.

“In August last year the shipments of cars manufactured by companies affiliated with the National Chamber were 14 per cent below shipments made in July. This year's shipments in August were 2 per cent above, a gain of 16 per cent.”

Efficiency Greater Throughout Industry

Mr. Rice spoke particularly of the startling increase in efficiency among workmen in the automotive industry, and said that if we could have the same increased efficiency among coal mining and railway workers it would be one of the biggest helps the country could hope for in getting back to a better business basis. He quoted Herbert Hoover as saying this would make possible a reduction of freight rates, one of the most necessary things today.

E. H. Broadwell, president of the association, called the convention to order and directed the first day's session, relinquishing the gavel on the second day to vice-president W. O. Rutherford. The sentiment expressed by Mr. Broadwell that “Civilization will not go into reverse; the automobile industry must go forward” prevailed to a marked degree.

The morning session was given over to a thorough explanation of the association's activities as showing how the members may get the greatest possible good from their affiliation. The speakers were General Manager M. L. Heminway, Credit Manager C. A. Burrell and Traffic Manager Herman Deuster.

The first speaker at the afternoon session was J. M. McComb, vice-president Crucible Steel Co. of America, who spoke for the raw material producer under the general topic of "Business Conditions in the Automotive Industry and Prospects for the Future."

Mr. McComb stressed the encouragement to be seen in the better business methods forced upon the industry and pointed out that many credit difficulties of the past would be eliminated through the safer and better buying methods which the change has produced.

M. A. Moynihan, of the Gemmer Mfg. Co., treated present conditions semi-humorously as the passing of an epidemic, stating that the "epidemic has passed and doctors tell us it will not return for 14 years," citing past business depressions at periods of 14 years apart. "Beware," he

said, "of 1935 and a Democratic administration."

Motor Truck Expansion Through Bus Development

The last session was featured by a paper by E. W. Clark, advertising manager of the Clark Equipment Co., who pointed out the tremendous future of the motor bus in this country and in this future saw the greater expansion of the motor truck industry.

Wm. H. Huff, advertising manager of the Disteel Wheel Corp., advocated co-operative advertising on a large scale to sell automotive equipment and parts, and association activity to bring about more effective dealer salesmanship. He injected a lot of humor into his talk which brought many smiles to his auditors.

W. O. Rutherford, vice-president of the Goodrich Tire & Rubber Co., told those present that they should "dream of ease and work like Hell!" He said that this industry has moved fast and that today those in it must get right down to fundamentals, and use new methods where new methods are necessary and convert their men to these new methods in success is to be attained.

F. S. Armstrong, sales manager of the Vesta Battery Co., and C. B. Davis, secretary and treasurer of the Warner Gear Co., of Muncie, Ind., spoke along lines of better business and increased energy in selling.

The convention, arranged by Manager M. L. Heminway, ably assisted by M. Lincoln Schuster, manager of the educational department, was the most successful ever held by the association.

Some Pertinent Facts on The Future of the Motor Bus A Field Which is Only in Its Infancy. Makeshifts Must Give Way to Specially Constructed Jobs

IT was only a few years ago that a very large percentage of the motor trucks in use were, in reality, but converted passenger car chassis," said Mr. Clark. "The use of these converted motor trucks soon developed two facts: First—that the world needed motor trucks. Second—that a passenger chassis could not be made to do double duty in the specialized field of freight transportation.

"Today a very large percentage of motor buses used in America are built on regular truck chassis. The use of these converted motor buses has developed two facts: First—that America needs motor buses. Second—that converted motor truck chassis cannot be made to do double duty in the specialized field of commercial passenger transportation.

"The population of the United States increases approximately 20 per cent every ten years. It has increased from 75,000,000 in 1900 to 105,000,000 in 1920, of which a disproportionate percentage has occurred in the cities. Urban population is increasing at the rate of 34.9 per cent as compared with 11.1 per cent in rural districts. The burden of transporting the immense armies of city workers to and from their homes each day has fallen, in the main, upon the trolley systems of America."

"The cessation of trolley construction has been due to the increasing costs of construction and the growth of the automobile as a passenger carrying vehicle. This new unit of transportation has supplemented existing transportation systems and by reason of its speed and flexibility,

Before the Credit Managers' Convention of the M. & A. M. A., Ezra W. Clark, of the Clark Equipment Company, Buchanan, Mich., made an address in which he predicted that the next few years will see the establishment of motor bus lines in nearly all of our American cities, either by or in competition with the traction lines.

Mr. Clark contends that the building of specially designed motor buses offers a potentially profitable field for the next few years. He particularly laid emphasis upon the fact that the requirements of the motor bus field were such that truck manufacturers must design special chassis for this class of vehicle, as it has been demonstrated many times that the standard motor truck chassis is not suitable for conversion into a motor bus.

has greatly enlarged the residential sections of all our cities. Our streets have now become too crowded for the convenient use of personal cars. The parking requirements are so onerous as to seriously restrict the bringing of private cars into the business districts of our municipalities.

"Sporadic outbreaks of 'jitneys' in various cities show the possibilities of motorized passenger transportation—these epidemics have also shown the fallacy of trying to operate high-powered, small capacity passenger automobiles at a profit. The public has been educated at the expense of the 'jitney' owners and operators.

"The growth and development of most cities has radiated from their business sections along fixed lines of transportation so that in many cities 'outlying' and 'neighborhood' business and recreation centers have grown up with startling rapidity.

"An analysis of the transportation facilities of any of our cities, in view of these facts, will show a wonderful opportunity now open to improve the present systems with motor bus lines. These may be operated by and in conjunction with the present trolley systems or by independent companies over routes laid out by city authorities so as to bring the wage earners of the cities into close touch with their places of employment and recreation.

"Every city owes to its citizens the duty of providing quick, convenient and comfortable means of transportation to and from their regular employment and recreation. This is a civic obligation that may be delayed but cannot be permanently avoided by municipal graft or corruption.

"The quickest, most convenient and most comfortable way in which the present transportation systems of our cities

can be supplemented and enlarged, is by the development and use of the motor bus. An exhibition of the successful operation of motor bus lines in some of our larger cities indicates that this phase of city life will see a marvelous and stupendous growth in the next few years.

Specialized work requires specialized equipment. The character of service required should govern the design and construction of motor vehicles used for the commercial transportation of passengers. Eliminating the automobile and taxicab, motorized passenger vehicles may be divided into the following four classifications:

School Buses: The development of the automobile has made rather startling changes in the systems of rural education. The isolated 'little red school house' is being abandoned in favor of larger consolidated schools in the centers of rural population. This evolution means larger and better schools with a consequent raising of the standards of instruction. School buses operated by townships and school districts, make regular runs, bringing the children to the central grade schools. Buses for this service are of two types,—very light construction for use on dirt and unimproved roads, and the heavier type designed for use on improved and hard roads.

Motor Stages: Seating from 12 to 20 passengers, operated by one man, pneumatic tired—speed of 20 to 35 m.p.h.

"This type of vehicle is suitable for suburban service and passenger traffic between cities. Motor stages of this type—the European 'Charabanc'—are now very largely used in California and many of the western railroads are using them as feeders to and from their divisional points.

Single Deck Buses: Seating from 18 to 30 passengers; operated by one man; pneumatic tires or cushion wheels; speed governed by ordinance.

"This type of bus can be used to supplement the service of double deck buses during the peak hours in cities where the volume of traffic does not require the use of a heavier type bus; also used as extensions to double deck but service carrying passengers further out into the suburbs; can be used by public utility companies to supplement present trolley systems and as cross town feeders. At present it is almost impossible to raise money for public utility extensions and improvements, and this type of bus presents an inexpensive method of extending present facilities without the need of expensive track and power house construction. This type of bus can also be used for transfer of passengers between railroad terminals and hotels.

Double Deck Buses: Seating from 40 to 50 passengers, manned by driver and conductor; operated on solid tires or cushion wheel.

"This type of motor bus is indicated for service along regular routes preferably on streets not occupied by trolley tracks, covering distances from 4 to 10 miles, along the main arteries of traffic. They can be profitably operated in large cities

and in smaller cities where there is a heavy peak load at certain hours of the day.

"There are, in addition to the types mentioned, one or two other phases of motor bus construction which may be described as incident to a period of transition. In this class should be placed the trolley bus, operating without tracks on rubber tires, obtaining its power from an overhead trolley. Also, the flanged wheel motor bus, operating economically and efficiently as a passenger vehicle on short line railroads where the traffic does not warrant the use of expensive railroad equipment.

"Motor bus operation in many cities has shown that standard truck chassis are not suitable for motor bus construction and service for the following reasons: excessive weight; too much unsprung weight; high center of gravity; rigidity of suspension; unsuitable gear ratios; narrow treads; large turning radius; stiff steering gear; high top clearance; high passenger floor; too short wheelbase, causing dangerous overhang.

"The development of these shortcomings of standard truck construction shows the necessity of special construction for motor buses covering the following points:

- Lightness with strength (insuring minimum gas consumption.)
- Small unsprung weight.
- Low center of gravity.
- Flexible control.
- Special transmission.
- Wide treads (eliminating swaying of bus.)
- Ample wheel base (to prevent undue overhang.)
- Short turning radius.
- Low-step entrance and exit.
- Low top clearance.
- Curb receipt and delivery of passengers.
- Ample brake capacity (to provide for frequent stops.)
- High-low gear efficiency (to provide for frequent starts.)

"The above points cover the desirable and undesirable features to be considered

in the construction of double and single deck buses for regular city routes. Motor stages and school buses also involve special considerations in design, but time does not permit an enumeration of these factors.

Bus Trailers

"Consideration should also be given to the use of bus trailers in the peak hours of traffic. They should have their own brake equipment.

"Out of the motor truck industry will arise in the next few years, THE SPIRIT OF TRANSPORTATION, which will give to America automotive transportation of passengers in specially designed motor buses. The nation now needs and can use a sufficient number of motor buses of the various types enumerated, to keep our combined motor truck factories in continuous production for years to come, an activity which will bring business to practically every member of the Motor & Accessory Manufacturers' Association, for these motor buses will need frames, engines, transmissions, springs, tires, bushings, bearings, lamps, seats, fenders and all the other necessary components that enter into the construction of commercial cars, not overlooking in this last analysis, rear axles. Many of these component parts and accessories can be used as standard units. Other parts need special designing in order to produce a special vehicle for a special purpose.

Wood Wheel Men to Join M. & A. M. A.

In session at Lansing, Mich., recently, the Automotive Wood Wheel Manufacturers' Association voted to dissolve their association and reorganize in January as the Wood Wheel Group of the Motor and Accessory Manufacturers' Association. Plans for affiliating with the national organization were accomplished through the co-operation of M. L. Hemingway, general manager of the M. & A. M. A. The organization will hold the last meeting in New York City during show week.



Veteran Truck Salesman Combines Pleasure and Recreation With Business

Chas. B. Wood, of Cincinnati, recognizing the advertising and sales value of a trans-continental truck tour, proposed the project which resulted in a trans-continental trip with Los Angeles, Cal., as the ultimate objective. Representing the G. A. Schacht Motor Truck Co., Cincinnati, Ohio, in a special sales capacity, and the Highland Body Co., Cincinnati, Ohio, as well as Mr. Wood anticipates very optimistic results, both from a business and pleasure standpoint. The truck is Schacht worm drive, of two-ton capacity, which has already covered over 100,000 miles. The reason for this is obvious. What would your thoughts be were you a disinterested observer of the above outfit?

single
Motor
time
these

en to
hours
own

will
IRIT
will
orta-
igned
s and
ouses
keep
omes
to
otor
tion,
mes,
ires,
ders
ents
com-
last
com-
used
spe-
spe-
spe-
spe-
nly,
fac-
their
as
and
ion.
or-
the
gen-
The
ing
ck.

ck
the
al
ty
us.

Business Thrives for Philadelphia's

"Serve-Self" Truck Garage

Customers Wash and Adjust Own Vehicles

Higher Monthly Charge Covers Expense

PHILADELPHIA, home of the self-serve cafeteria, has a truck garage conducted on a similar plan. True, the customer doesn't have to drop nickels in a slot to get results, but he waits on himself, even to the extent of washing his own vehicle and repairing it.

The garage, which is 100 x 130 ft., is operated at 811 N. Taney St. by F. Lyons and W.

N. Wilkins. It is advertised nowhere but on the front of the building, by signs of the usual kind, and in the city telephone directory, where small display space is taken.

"Customers aren't just permitted to wash and repair their cars," explains Wilkins; "they are expected to do it. In fact, nobody will do it for them, except in a case of emergency. Everything is wide open here, and our confidence never misplaced thus far in our customers."

This is all the more remarkable when it is known that those who store their cars here have free use of the following:

About \$500 worth of small tools, 20-ft. work-bench equipped with vises, mounted electric drill, motor stand, emery wheel, chain block. The washstand at which they may work is equipped with drain and good lighting facilities.

"Our patrons are thoughtful, too," says Wilkins. "When they have finished working they even habitually cover up the emery wheel and hook up reel light."

Not a day or a night passes that customers are not "tinkering" with and washing their vehicles, except on Sunday,

DO YOUR OWN "TINKERING"
Here are customers' privileges in this uncommon garage: Portable electric drill, so mounted as to be equal to heavy drill. Stout motor stand, capable of sustaining weight of any engine. Chain-block operated by overhead system. Emery wheel for grinding parts. Reel lights. Approximately \$500 worth of small tools, including wrenches, pullers and the like. Twenty-foot work-bench. Car washing stand, with plenty of buckets, sponges and brushes.

By K. H. LANSING

when there is rarely a truck owner or driver about the place. The garage accepts about twenty-five passenger cars for storage in addition to the trucks.

"We make a specialty of trucks," says Wilkins, "and would rather have them any day than passenger cars. When a truck comes in on a Saturday night it is through till Monday morning and doesn't have to be moved."

Mostly Mechanics

Those who store passenger cars here are, in virtually all cases, working men. Some are shipyard foremen, others are general mechanics, others are pressmen, and so on down the line. They are quite capable of doing their own repairing of the lighter sort. Some even thoroughly overhaul their motors. Of course, nearly all the drivers of the trucks stored here are more or less expert in making minor adjustments and doing light repair work. There is little or no amateur botching that needs assistance to be set right.

Because of this "wide open" plan, a total stranger, unknown, for instance, to even a friend of any one connected with

the place, would not find it particularly easy to store his car here immediately. He would have to be checked up by some one about the garage before being put on a "help yourself" basis.

"We all know one another here," says Wilkins.

While customers even open and close the garage doors themselves, one employee is assigned to the duty of

seeing them in and out, to prevent collisions, or any other untoward occurrences.

Buckets, sponges and brushes are supplied for the use of customers who wash their cars. There is no direct charge for this accommodation, any more than for any other. All this sort of expense is cared for in the slightly higher charge for storage—the only item. But, while the customer might, for instance, store a Ford in another garage for seven dollars a month, yet be charged ten dollars in this "serve-self" establishment, he considers the extra accommodation of being able to save on washing his car under comfortable circumstances and repairing it with a full complement of good, appropriate tools and other mechanism. Charges for larger vehicles range from \$12 to \$15 a month.

In case of a serious accident to a customer's truck or automobile, such as the breaking of a spring, the garage has a list of outside machine shops from which the customer could make a choice to have his vehicle sent.

Of course, no one need select from this



No, This is Not a Garage Hand. "Help Yourself" is the Slogan of This Garage



Work-bench Where Garage Customers Work on the "Serve-Self" Plan

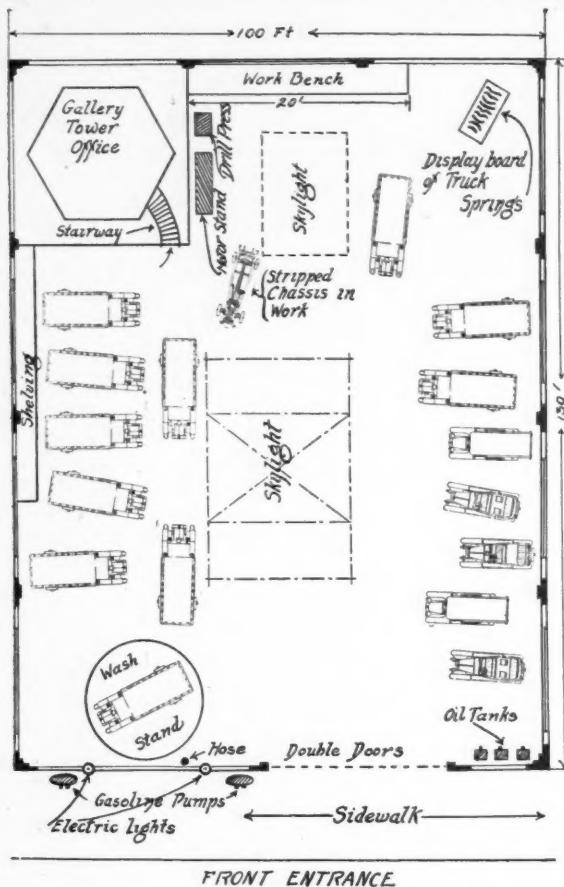


Diagram of the Taney Auto Repair Shop, Philadelphia

list. A customer could "serve himself" in that way, too.

ployees are sufficient and overhead is lower than in the usual type of garage.

Trucks Save \$28.80 Per Day Over Team Equipment

THAT the truck is considerably cheaper than horse equipment and that the work of road building can be carried on with greater dispatch is the unanimous opinion of most road contractors and highway superintendents. Highway superintendents are so very busy these days pushing road work to completion that few of them are inclined to keep an accurate account of their expenses. They are satisfied that the trucks are saving them money and what's more, lots of time.

Wm. Tonkel, road superintendent of Allen county, Ft. Wayne, Ind., is keeping an accurate account of all road building projects in his precinct and submits figures which show that trucks are big money and time savers.

"Allen County," says Mr. Tonkel, "uses its trucks entirely for maintenance and repair work. When new roads are to be constructed, the work is let out under contract. For this maintenance and repair work we decided that a $3\frac{1}{2}$ ton truck is too heavy. Our trucks have a $3\frac{1}{2}$ yard body which is always heaped up, so we carry approximately 4 yards of stone, weighing approximately 5 tons. This is

something of an overload, but our trucks stand up very well under it. The northern part of Allen County is rather hilly; the rest is fairly flat. Our roads are made of crushed stone, macadam and gravel.

"At present we are repairing a piece of road 10 miles from Ft. Wayne, making a 20 mile round trip. The material is



Acme Three and a Half Ton Job on One of Its Daily Four-Trip Hauls. Operating Cost Per Day is Estimated at \$19.26

Lyons and Wilkens keep a limited stock of truck parts and equipment for sale. A stock of truck springs, samples of which are kept in plain view on the floor, near the common work-bench, is sold by this concern on commission. The garage does not make a business, however, of handling passenger car parts and accessories. The heaviest call here is for truck gears and brake parts.

So there will be as much floor space as possible, the office of the garage is in a sort of tower gallery at the rear, overlooking the entire floor.

Care is taken to keep the central space of the floor clear for egress and ingress. The trucks are stalled along one wall and the rear of the building, with the passenger cars in a space against the opposite wall. Not more than thirty-five vehicles are housed in the garage at one time.

There is little or no reason for elaborate records or card systems here, because of the plan upon which the garage is conducted. One or two employees are sufficient and overhead is lower than in the usual type of garage.

crushed stone, which is delivered at Ft. Wayne, in freight cars. The truck is loaded by hand or by a chute, and run out to the point where the road is being repaired. A dump body with adjustable tail gate permits the even distribution of stone along the road. After discharging his load, he returns to town for another.

"It is very easy to make four such trips in a day, and if forced a little, we could make five. However, making four a day we can haul 16 yards of stone per truck to the point. The cost per day on this haul is \$19.26, or \$1.20 per yard, and 1.24 cents per yard-mile. If a team were to do this work, it could make only one trip a day hauling 2 yards of material. A team costs \$6 a day, so it would cost us \$3 per yard to haul stone to this point, against a cost of \$1.20 by truck. Besides, a team could not spread stone as the truck does.

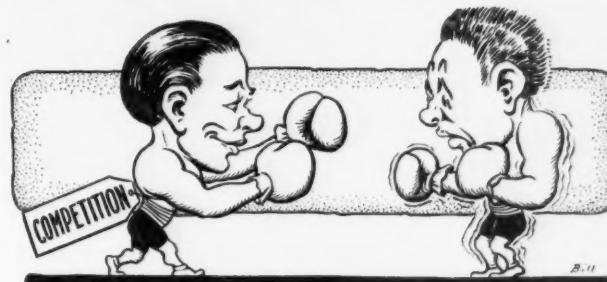
"Suppose that, instead of repairing this road, we were building it. It takes 1166 yards of gravel to build a mile of road. Hauling by team and handling 2 yards of gravel per day, it would take us 583 days to perform the work. A truck, handling 4 yards of gravel to the load, or 16 yards a day, could do it in 67 days. At the very low cost of \$6 a day for a team, it would cost us \$2208 to haul the material; hauling by truck, at a cost of \$19.26 a day, it would cost us \$1290.37, giving us a saving of \$917.63.

"Building a mile of road that distance from town would cost us by truck \$1.11 per yard, and by team, \$1.89 per yard, a saving of 78.7 cents per yard, or 41 6/10 per cent, in favor of the truck. But even though the truck did cost more, it would still pay a road superintendent to use a truck because of the greater amount of material that he could handle in a given time. As in all outside work, it is necessary to make the most of good weather.

"The trucks employed in this service make a very high mileage, averaging from 75 to 90 miles a day. The average for an Acme truck last year was approximately 74.5 miles. The very low fixed expense of 93.3 cents a day is due to the fact that these trucks have no taxes, license, or administrative overhead, and only a low garage and insurance charge. Last winter was very open and we were able to work 285 out of 305 working days. The average cost for the time worked was \$18.37 per day. All our repair charges are lumped, but the \$600 per year is ample.

Are You Half Licked Before You Start a Sale?

It is Essential to Respect Competition, But It Does Not Pay to Fear It



Why This Dealer is Failing to Make Many Sales

By A. W. BROWNELL, Advertising Manager Commercial Car Journal

RECENTLY two clean cut, intelligent men of the local automotive trade came to my office and asked if a certain motor truck manufacturer was open to a new distributor proposition in Philadelphia.

Before answering, I inquired why they thought this particular manufacturer would be likely to consider a change in this important territory from his present representation.

One of the men replied: "The present dealer is a good man, intelligent and hard working, maintains good service facilities and is apparently well financed, but—he is representing his manufacturer on a defensive basis."

When asked what he meant by this, he replied:

"This man is apparently frightened by the competition coming from other dealers. He knows he has a good truck but he has fallen into the habit of assuming a defensive attitude in his sales efforts rather than assuming and maintaining an offensive position."

Don't Cringe; be Assertive

"In short, he is constantly being impressed with stories that certain other popular makes of trucks are out-performing and out-selling his own, and as a result is half licked when he goes in to sell a prospect."

"His sales arguments are good and he sees his prospects often and regularly, he also has a good personality, but there is something vital lacking in the way he presents his arguments and in his final stand for the signed order."

After these men left I began to analyze what they had said and I realized that there are many dealers and salesmen who unconsciously are falling down in the same way.

We are too prone to look with envy upon the pasture next to us and wish we were over there, because it looks so much more fertile and attractive.

We too often feel the other

salesman has the edge on us, both in sales ability and in value of product.

It is rather easy for a truck dealer to form this mental attitude—he is one of many dealers in the territory competing for orders. He is in daily competition with most of these men. The prospects whom he calls upon often point out supposedly superior mechanical features in the other fellow's truck and argue that this particular dealer is not offering as much in service, etc.

Happening day after day this is likely to break down the dealer's morale and place him on the defensive—just as is the case with the dealer referred to above.

When a dealer selects a truck or line of trucks to represent, in a particular territory, there must be good reasons for the selection, at least enough for the dealer to stake his time and money against the sales value of the make of trucks selected.

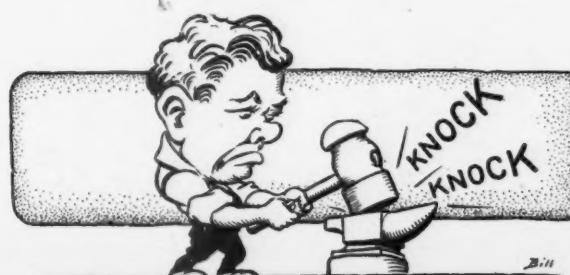
Waning Enthusiasm Sure Failure

Assuming such to be the case, the dealer must, to be successful, constantly retain that fine confidence and enthusiasm regarding his product so manifest at the time of undertaking his first sale for the new line.

It is essential to respect competition, but it does not pay anyone to fear it.

When you knock the other fellow's truck it shows you fear its competition. When another salesman hammers yours it shows he fears your competition.

The more the other fellow knocks the better and more confident you should feel.



Remember he can't sell his truck by criticizing yours—therefore why should you fear this sort of competition and allow it to lower your morale.

I know a successful business man who has a number of salesmen calling upon him daily, representing numerous and diversified products. Some of these products he wants to buy—actually needs them, but his policy is never to buy, but to be sold. In other words, he tests out the selling ability of each man by bringing up objections one after another.

The salesman who gets his order has to work for it aggressively—has to retain the offensive in his own hands. To do this he must have both confidence in and enthusiasm for his product and he must definitely show why he has reason for his belief.

Aggressive Confidence Sure Winner

Many truck prospects are like this particular business man—they must be sold before they will sign the well-known dotted line—and today nothing less than sincere confidence and real enthusiasm will turn a worth-while sale.

Therefore the dealer who assumes the offensive at the outset of the interview and retains the offensive throughout, who talks of his product with confidence and enthusiasm, who compares the mechanical features of his truck with those of his competitors through suggestion rather than by knocking, who does not allow the prospect to become a better buyer than the dealer is salesman—plus having a good conception of the manufacturer's haulage problems and their answers, is the man who is bound to command respect, and is sure to be a successful salesman and dealer.

Remember that vital spark of confidence and enthusiasm which is so essential no matter whether it be used in selling truck transportation or in beating the other chap in eighteen holes of medal golf.

Keep the offensive—and your selling success is assured.

If Your Motor Truck Tire Sales Slow Up

THERE'S A REASON!

The Truck Tire of Today is a Proven Institution. Generally, Poor Tire Showing is the Direct Result of Improper Load Distribution, Ignorance and Other Evil Practices

Educate the User to Recognize These Facts and You'll Do Both Him and Yourself a Service

By A. V. COMINGS

THIS has been a hard summer for the truck dealer. Like all other business men he has had to meet conditions not at all to his liking, but most of the better type of dealers have made the grade and are ready for the better business that now seems assured in slowly increasing volume.

It has been a time to try the souls of the better class of business men of this country. They have had to meet competition of the worst sort, yet it is the

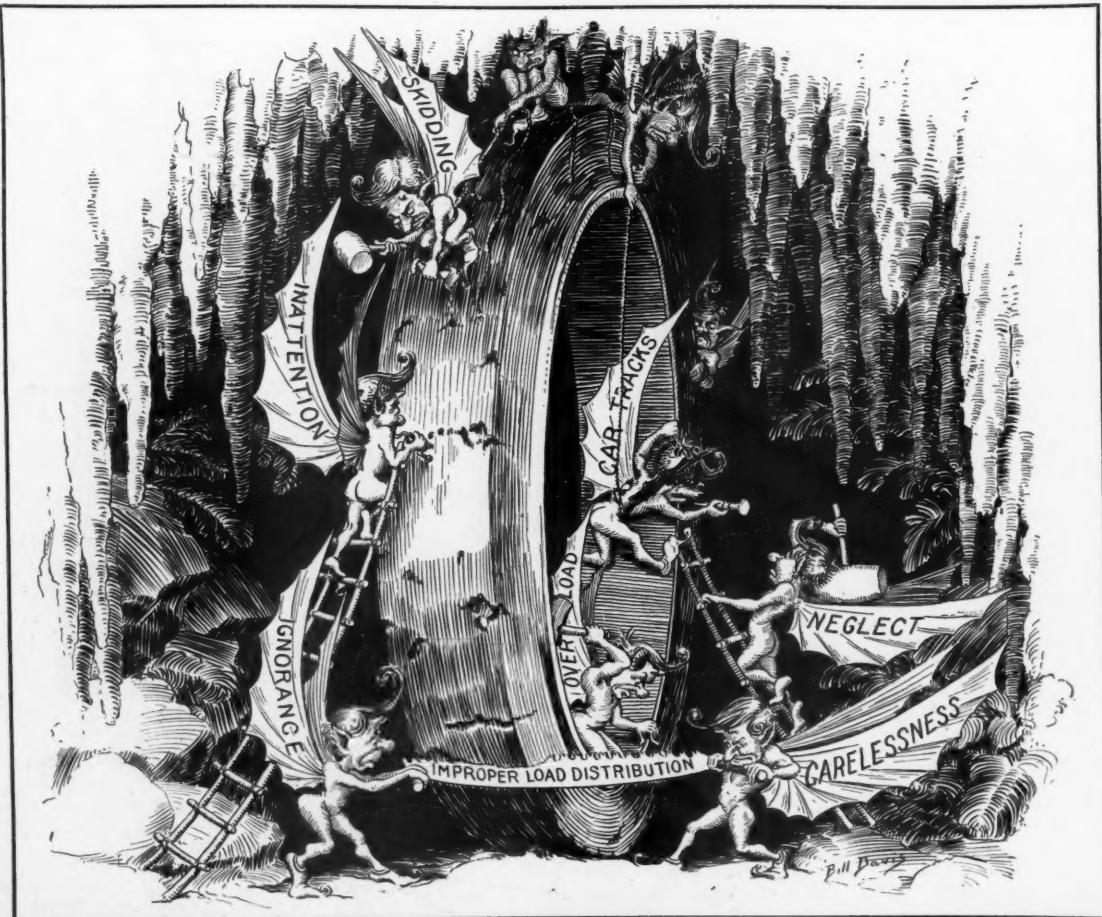
truck tire dealer who has not yielded to the temptation to lower his standards of doing business who is surviving, and who is going to get the big share of the future business.

The thoughtful tire dealer is giving more attention to the things that bring success, or bring failure, in his business, and in this he is being guided in every way possible by his factory. For the big factories, at Akron and elsewhere, are alive to the present conditions, and are helping their dealers as never before

with advice, educational work, and in every way possible.

The manufacturer, because he can draw on the experience of thousands of dealers and can see what is wrong or what is right in their methods, is in a position to help his dealer organization wonderfully. And this help is being extended to dealers today, generously and freely.

Many a truck tire dealer fails because he doesn't take full advantage of all the sales possibilities in his territory. He thinks he is working every prospect, but



Is the Tire Always Responsible?

OCTOBER 15, 1921

THE COMMERCIAL CAR JOURNAL

21

careful analysis of the territory will show differently.

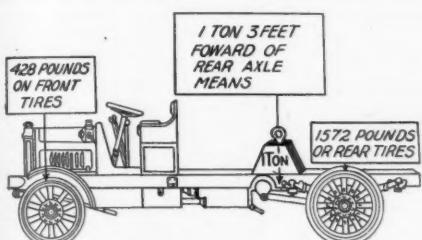
There was the case of a certain Eastern tire dealer, for instance, who owed one of the big Akron companies \$5000, and who seemed utterly unable to make any headway toward building up a profitable business. Yet, he was in the center of an excellent tire territory.

So the company sent one of their sales force down to analyze the man's field and to show him, if possible, where he could improve his business methods.

Every Problem Has Its "X"

This expert found that the dealer had a list of but 156 prospects and was working this small list day after day. The factory man knew there were more tire sales possibilities in this territory, so he got busy, and the result was he unearthed 1500 prospects who were using trucks and who were logical buyers of tires in this dealer's territory.

The factory man got the addresses of all these truck owners and routed the deal-



er's salesmen for him, so that they called on the prospects in such rotation that no time was lost, and the result was that the salesmen were able to call on several times as many prospects as formerly. Repeated prospects' calls gets business, if the salesman is really a salesman, and, of course, business began to pick up immediately.

Within two months this dealer had paid off the \$5000 he owed the factory and had ordered \$8000 worth of tires in addition, which he paid for when the bill came due thirty days later. This is the story of an actual case.

Does systematic and thorough cultivation of the territory pay the truck tire dealer?

This incident, which is but one of many similar ones worked out all over the country, surely proves that it does.

Every big manufacturer of truck tires is ready and willing to help the truck tire dealer solve his problems, is ready as a rule to send an expert into the dealer's territory to see where the dealer is at fault, and to help the dealer build up his business in every way.

Not More But Better Dealers

The big tire companies do not, as a rule, want more tire dealers these days. They want better tire dealers, and the result is they are training their salesmen and their district men to not only sell the dealers his tire supply, but to teach the dealer how to best sell his merchandise. The factories know that if they show a dealer, who is merely dubbing along and struggling hard to make both ends meet, how to make his business pay well, with-

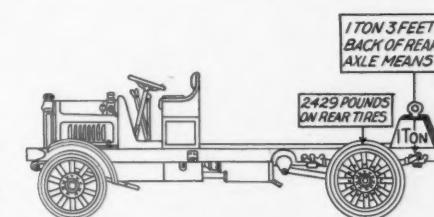
out any more real work on his part, merely better directed work, that the dealer is going to be a better customer of the factory, for he will be selling a lot more truck tires.

Don't Cut Prices

It is easy enough to cut prices on tires to make a sale. That's why there are so few genuinely successful truck tire merchants today. Many dealers follow the easiest way, and soon pass out of the picture.

It costs money to run a tire business and give the kind of tire service that keeps trucks running. The truck owner **must** be sold on this fact, either now or eventually. If he is a really good business man he can be sold by a proper presentation of facts and figures. Get those figures together on your business, and show him why he has to pay list price to save money for himself.

The truck tire sales manager of one of the big Akron tire manufacturing companies told the writer once that time and again, in going around among his dealers over the country, he has had to listen to stories of "that dealer down the street is ruining us by cutting prices." On his next round nothing would be said about



"that dealer down the street," for "that dealer" had long since gone out of business and no longer figured in the reckoning. And the dealer who had complained of him, but who still had had nerve enough to maintain his prices, was still doing business at the same old stand.

And you'll find that where there is a successful tire dealer, he is not the one who has a reputation for price cutting.

What Service Means to Sales

It is sometimes very difficult to make a truck owner see the value to him—not the theoretical value, but the actual dollars-and-cents value—of buying his tires from the dealer who is equipped to give him the right kind of service.

And by equipped I mean that the dealer shall have not only a complete supply of tires and the shop and tools to do the work with, but that he shall have drilled into his organization the spirit of service so thoroughly that his men are eager and ready at all times to do anything that will build and sustain for their shop the name of being the best tire service station in their community. Getting this spirit into an organization is no easy task, but the successful tire dealer will not stop till he has sifted his organization down to men who are willing to work on this principle.

Here is an actual example of what I mean by the sales value to a dealer of having real service to sell.

In a certain Eastern city a fleet owner

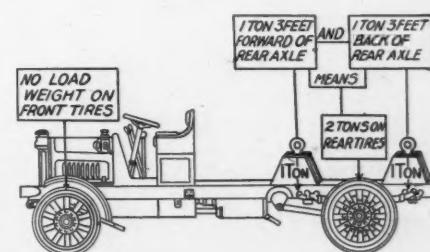
with twelve Autocar trucks was ready to make his annual contract for tires for his fleet, and the competition narrowed down to two dealers, one a jobbing dealer without service facilities, who offered the tires at \$100 each, and the other a truck tire dealer equipped to give first-class service, whose figure was \$115 per tire. The difference of fifteen dollars per tire on a fleet of twelve trucks was some item, yet the tire dealer with the service landed the order. Here's how he did it:

Cash in on Your Service

He showed the fleet owner that the extra cost amounted to but five cents per tire per day insurance, insurance that made certain for the owner prompt service every time a truck of his was in need of it. He showed this owner where a truck disabled with tire trouble, and without his kind of reliable service to put it on the road again, would very quickly eat up in lost profits the slight extra cost per tire that he was asking.

And he was able to sell the fleet owner on the fact that he would actually save money in the long run by buying his tires at \$115, rather than by taking the jobber's tires at \$100. This took real salesmanship, of course, but that is something that every truck tire dealer must have if he is to succeed.

Salesmanship does not consist in merely knowing the quality, sizes, prices, etc., of the tires one sells; it means being



able to show every prospect in a convincing manner just why he will save money by using your tires and your service, even though the first cost may be greater than your competitor's.

Many problems will be put up to the truck tire dealer for solution and he will have to use his head in solving them, for some of these problems puzzle even the experts back at the factory.

For instance, there was the case of the motor trucks being used in handling freight trans-shipment at Cincinnati, the job that the railroads have put in to thoroughly try out modern methods of handling freight at transfer terminals. Naturally, the work of motor trucks on this job, their cost of operation and all that enters into it, were watched with the greatest care, and any possible fault the operator could find with them was magnified to the limit.

Diagnose This Trouble

And the tires on the rear wheels of these trucks broke down continually and made a big item of expense that the truck operators didn't like to see pile up. Nor did the truck tire dealer, who had supplied the tires.

A very careful check was made of weights, distribution of loads, whether the trucks were being overloaded, etc., and the local dealer found it impossible to locate the trouble. The tires furnished were exactly the same as were being used successfully in other cases where the loads were as great, and it looked for a time as though the tire dealer was up against a stone wall.

So he called for help from the factory and the truck tire sales manager went down to Cincinnati to see if he could locate the trouble.

Here is what he found:

Checking up on weights he found that the tires were fully adequate to carry the weights theoretically given them to carry, but—

The trucks were all fitted with demountable bodies, of steel, and no allowance had been made for the extra weight of these heavy bodies, and of the heavy operating apparatus that was mounted on the truck frame for moving the bodies on and off the truck. This extra weight was sufficient to prove too much of a burden for the tires, and just as soon as this was discovered and the proper sized tires were put on to carry the actual load, not the theoretical load, there was no more tire trouble, and the jobs have stood up satisfactorily ever since.

Here was a case where tires were held responsible for trouble that was actually incurred by another agency.

The truck tire of today is a proven institution, and when a tire of known quality and known ability to stand certain loads and conditions begins to give way long before it should, the dealer to whom complaint is made should go into

a very thorough analysis of the conditions under which the tire is being used, before he admits there is anything the matter with the tire itself. He will usually find that the truck owner is either consciously trying to "put something over" on him, or else does not realize himself just how much he is overloading or abusing the tire. And a truck tire, just like a piece of steel, or a machine, or a human being, has its known limits, and when it is forced to go beyond that limit it will break down, just like the steel or the human being.

If you tried to crush stone in a corn sheller you would expect the corn sheller to break under the strain. It is just as ridiculous to expect a tire that was built to sustain a five-ton load to stand up under an eight- or a ten-ton load.

Watch the "Overhang Load"

A factor in determining the life of truck tires which should always be watched carefully is the "overhang load." A tire that will stand up and give perfect service under a five-ton load properly distributed on a truck, will break down rapidly if that same five-ton load is distributed so that too much of its weight comes on the overhang of the truck frame, back of the rear axle. There is an exact formula in mathematics that will show how rapidly weight multiplies when it is given extra leverage to bear down with, and this is just what happens when weight is piled up on the overhang.

For instance, on a truck with a 14-ft. wheelbase, a ton of load bearing down on a point of the frame 3 ft. forward of the rear axle exerts a weight of only 1572

lb. on the rear tires, the other 428 lb. being carried by the front tires.

Move this ton till it bears down 3 ft. back from the rear axle on the overhang, and the rear tires then bear not only the original ton, but the weight is increased by 429 lb., nearly a quarter of a ton, through the increased leverage it exerts because it is so far out. It takes some of the weight off the front tires, because of its balancing effect on the load forward of the rear axle, but it adds this weight also to the weight on the rear tires, and it sure punishes the tires on those rear wheels.

If a ton load is put 3 ft. back of the rear axle, and another ton 3 ft. forward of the rear axle, they just balance each other; none of this load is borne by the front tires, and the entire weight of the two tons then falls on the two rear tires.

This matter of the actual relation of load distribution to tire wear is one that should be very thoroughly gone into with the truck owner when selling him truck tires, for careless drivers, or rather ignorant drivers, will cost him hundreds of dollars a year through bad loading unless they are made to see why they should distribute their loads to the most economical advantage. The average driver is willing to do the right thing if he knows what that particular thing is. He should be taught.

Not only do the tires suffer through bad loading, but the entire rear axle mechanism will suffer if the rear end of the truck is given more than its proper proportion to carry. Bad loading can be more expensive even than overloading, and it is easily avoided by a little extra educational effort.

Continued Progress in Automotive Industry

In August, normally the lowest seasonal level in the automotive industry, sales of parts and equipment to car and truck manufacturers moved forward more than one per cent beyond the July figure.

Purchases of parts, units and equipment by automobile passenger car and motor truck manufacturers from three hundred parts and accessory manufacturers show an increase of 1.31 per cent. In July the increase was 1.68 per cent and in June the curve had shown a decrease of 15.19 per cent.

During August, the automotive industry also showed betterment in two other fundamental respects—the total past due accounts decreasing 17.06 per cent and the total of notes outstanding dropping 5.30 per cent.

The percentage changes for the last eight months follow:

Comparative Figures for 1921

Month	Per cent Change*	Per cent Change**	Per cent Change***
February, 1921	66.15 Inc.	17.07 Dec.	39.08 Inc.
March ..	93.30 Inc.	16.57 Dec.	16.38 Dec.
April	32.93 Inc.	4.49 Dec.	5.94 Inc.
May	00.13 Inc.	15.64 Dec.	16.77 Dec.
June	15.19 Dec.	4.79 Inc.	10.37 Dec.

July 1.68 Inc. 10.79 Inc. 7.90 Dec.
August .. 1.31 Inc. 17.06 Dec. 5.30 Dec.

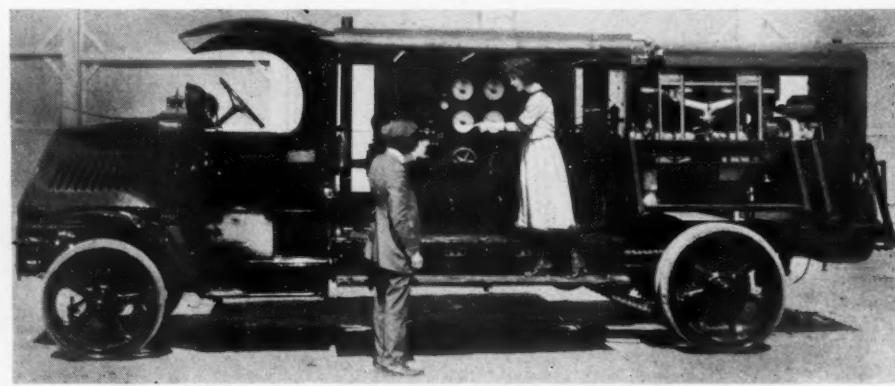
* Purchases of parts, units, equipment, etc., by automobile passenger car and motor truck makers from 300 parts and accessory manufacturers by months—per cent change.

** Totals of past due accounts reported—per cent change.

*** Totals of notes outstanding—per cent change.

U. S. Truck Smiles and Fights

For the first four days of October the United States Motor Truck Co., of Cincinnati, O., had booked more orders and was faced with more unfilled orders on hand than during the same period for the past eight months. The firm at its regular quarterly meeting recently declared its regularly quarterly dividend of 1 1/4 per cent.



Portable Power Plant Used in Filming "The Cup of Life"

This plant, an electrical power plant in the Thomas H. Ince Studios in California, supplied power for 40 twin arc lights. It is mounted on a 3 1/2 ton Mack truck and equipped with a 210 hp. Seagrave gasoline motor and directly connected to a 100 kilowatt generator. The plant, complete and ready for the field, weighs 7 tons.

Are You a *JOY* OR *GLOOM* DEALER?

Here Are Two Interviews With Dealers
Who Are Looking at the Truck Business
From Directly Opposite Viewpoints

Read What an Old-Timer Has to Say

By C. S. PERRIE

WHAT are you doing, Mr. Dealer and Distributor, to meet your overhead and to keep your sales organization intact during the fall and winter months?

Are you going to make a determined effort to develop business or are you going to join that class of dealers that waits for business to come to them?

Will you be spoken of in the present tense in 1922 or the past tense?

It's up to you.

Forget about the days of the "come and get it." That's history. Resign from the Pessimist Club, whose members can win but who are poor losers, and join the Optimistic and Business Boosters' Club.

The "crape hangers" are ever with us in the automotive industry as they are in other industries. These exponents of gloom not only cast a shadow over all they meet but they are largely responsible for destroying business confidence—for stopping the wheels of progress. I met one of these birds the other day when the sun was shining, one of those days when you feel full of pep and capable of sawing and splitting half a cord of wood before breakfast, even if you don't do it, or do it only mentally.

This representative of "the greatest industry on earth," to use P. T. Barnum's slogan, was seated in his office and his type must have been the inspiration of those Gloom cartoons, for when I asked how business was, he said I had a h—l of a nerve to ask what I already knew. So right then and there I handed him an honorary membership in the Pessimist Club and remarked that I knew business was not so rotten as his type said it was. I comforted this agent of gloom with the information that not 75 miles away from him was a brother dealer, selling the same line, that was still selling trucks and lots of truck equipment and that the factory sales manager was considering giving this live wire the Gloom's territory. But the only rise I got was a remark about there being no business but—the exact words

could only be printed on asbestos paper. I was mighty glad, however, to leave this exponent of the industry and get out once more in the bright, warming rays of the sun.

Gets Down to Brass Tacks

A few blocks away I called on another dealer who admitted business was not as brisk as of yore, but this dealer belonged to the Joy class.

He knew his salesmen were not taking orders, but had to fight to sell. He also knew that intensive sales methods, involving long and arduous hours, had replaced the days of no sales resistance and that he had to work a darned sight harder than his entire sales organization. And this dealer was doing it every day, and some nights, for he realized that business was on the mend, that it was only a question of weeks or a few months before the public would be buying trucks.

Said this dealer, whose name is withheld by request, "We hear much about the period of readjustment through which we are passing and that it is responsible for the lack of truck sales. It may be a factor and one of the reasons why business is not flocking to our salesrooms, but I like to believe that approximately normal business can be developed if we truck dealers, and salesmen, and manufacturers, will forget about the last few years and realize that from now on we have a sales proposition, not an order-taking business.

Enter the Calamity Howler

"When business slowed down, when the order taker went up against it hard, and the daily press published articles about the unemployed, what did many truck dealers do? I refer to the newer class, attracted to the industry by quick profits and without a real sales force. This class became calamity howlers. They did worse, if you please, for they fostered the spirit of 'no business,' and it is this class of pessimists that can be blamed for much of the so-called 'slump' in the truck business. And while I am using the ham-

mer, let me take a fling at the factory heads who listened to these calamity howlers and believed what they said, because dealers were not keeping the wires hot for deliveries.

"The attitude of the dealers I refer to, and some factories, reminds me of a little stunt my professor at college pulled. He said that the human being was given to exaggeration, that truth was sadly handicapped when messages were circulated by word of mouth. He called one of the students to his desk and whispered to him, then sent the student out to the hall. Another student was sent out to whom the first student repeated what the professor had told him, then came back in the class room. A third, fourth, etc., student was sent, each replacing the preceding student. Finally the last student was called in and requested to tell the class what had been told him. Then the professor gave out the information he had given the first student. It had to do with figures, but if I remember rightly they grew from a small sum to a large one which, of course, bore out what the professor had said about exaggeration. We have too many of the student class among dealers, and I guess a few of the factory heads cannot be classed among those who can be trusted when it comes to passing along cheerful news."

I remarked I saw the point of the analogy but questioned his remark about the factories. They were, I said, anxious to build business, to create confidence.

"Some are and some are not," was the reply. "My company is building confidence among the dealers, but lots are not. The case of Bill Jones across the street is an example of the lack of confidence. Bill took on the Blank truck just about the time the reaction came. Bill was hit quite hard, but being an optimist he kept plugging along, hoping to get a better break. Bill used to tell me, 'They can't always give us the worst of the breaks, Jim, because every dog has his day.' Well, his factory began retrenching. The exec-

utive who sat on the cash box was as busy as a gardener pruning a tree with the blight. They cut off the 50-50 advertising co-operation and told Bill to stand the bill. Reduced sales co-operation, service aids and a lot of other things which a dealer appreciates and needs from the factory. What they did not do was to tell Bill that they were going to give him all the help they could in a moral way. Replies to Bill's letters might as well had a black border, for there wasn't a cheer up note in the bunch.

"Oh, yes, Bill is struggling along, but it's a lone fight. Wouldn't it help a lot if Bill's factory would climb aboard the Joy wagon, spend a little time and money telling Bill and the world what a great and glorious thing motor highway transportation was, that it was first, last and always for **preaching, acting and believing in the industry?** What we need is the confidence of everyone in the industry, and any person who can't act and preach it ought to be thrown out. Business will begin when we make it start and it isn't going to be started by waiting for George to do it, but by everybody doing it. And right here I want to congratulate THE COMMERCIAL CAR JOURNAL for preaching confidence and business sales methods in the truck industry."

The dealer interviewed is noted for his candid opinions. To change the subject I asked if he was keeping his sales organization intact, if he had made any changes in his policies or in his sales force.

"I am keeping my sales organization and other departments intact. My overhead kept working right along and I found that it was getting a few laps ahead of the profits. After carefully analyzing the overhead of the different departments I came to the conclusion that I would call in, and separately discuss the matter with each department head and his subordinates. The first meeting was with the sales force, wholesale and retail. I went over the overhead, sales, costs, profits, etc., of the past year and pointed out

that conditions required retrenchment if I was to continue in business. There were some long faces pulled at this remark and some had visions of the good-by ticket on pay day. I remarked that retrenchment and salary reductions were the most popular indoor sports in every line of endeavor, but I wasn't going to cut any salaries or commissions—YET. I just put it up to the boys that we had worked shoulder to shoulder and built up a reputation for a square deal house and that I did not propose to see the sheriff come around and nail up the doors. We could keep that unwelcome party away if every man in the organization would realize that it will take darned hard work, and plenty of it, to keep the boat on an even keel. 'Boys,' I said, 'it is up to you whether we sink or swim, whether your name is on the pay roll or not. I'm with you and will work as hard as any of you, and if my plan meets with your approval, let's go.'

"Did it go over? It did. Right then and there we discussed every angle of the times and planned a campaign, also to hold weekly meetings. The plan has been successful, for every salesman, with the exception of two, pledged co-operation. It was suggested that a sales board be employed and every man's record, calls, sales, etc., be posted so that the slackers would be shown up.

Why the Star Salesmen Fell Down

"I had a couple of what you might call star salesmen—good mixers and a large acquaintance. Played good golf and belonged to social organizations. One had a good stock in his cellar when the dry spell set in. They took lots of orders in the old days and with short working hours. You know the type. Well, these two got so soft and flabby that they just couldn't set their alarm clocks for earlier than 9 A. M. or cut their lunch from two hours to thirty minutes, so they dropped into the second division in a few weeks and soon were fighting it out for last place. The boys hinted that the blue

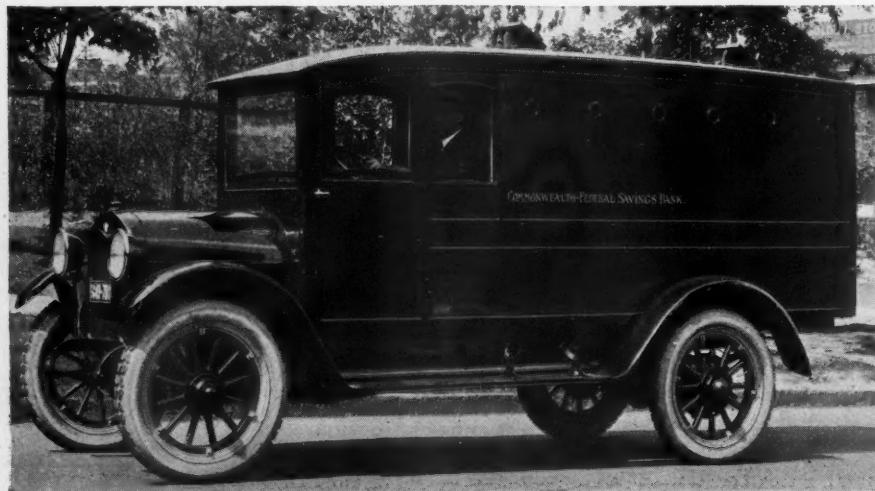
ticket was theirs, but after a talk I gave them another trial. No results, and they departed for other fields.

"I adopted the same methods with all of the departments and found that the incompetent eliminated themselves. While I did not reduce my overhead I did get greater efficiency and more business. Competition arose in each department to increase production and lower costs, and as a result my net profit is some per cent better than a corresponding period. One advantage of the plan has been that the real capable men who slacked off because of easy conditions got back into their stride and are delivering value for money received. I'll admit that some of the sales force got mighty discouraged the first few weeks, but when I noted the signs I had a heart-to-heart talk with them and with the two exceptions mentioned all are still selling trucks. Of course I realize it takes real sand to stick to a job that pays small in comparison to the old days, but the boys that stick are the ones that will cash in when the business reaches its peak and that will before long. My door is always open to any of my employes and we are like one big family. As to being busy myself, see that bunch of golf sticks in the corner? Well, I was presented with that outfit last winter and have used them but once. Do I love golf? I sure do, but the game will still be played when I am able to steal a few hours off, but that will not be this fall and probably not until next summer."

At this point the service manager entered with a bunch of papers and a look of determination on his face. Much as I would have liked to remain and hear the fireworks, courtesy required my absence, so I bid the dealer good day and walked out into the sunshine.

How much better would the truck industry be if it was represented by dealers like Jim?

And wouldn't we get back to real business much faster if we all started and did not wait for George to do it?



Bullet-Proof Reinforcements Convert This Otherwise Stock Babcock Panel Body Into a Veritable Fortress

The attention of bankers, during these days of rapidly recurring robberies, is being focussed on protective measures such as illustrated above. The Commonwealth Federal Savings Bank, of Detroit, in acquiring this job and special bank body, has not only greatly reduced the robbery hazard, but has increased the confidence of its patronage by demonstrating a desire to safeguard their money in every way possible. It has advertising value. Except for the complete interior bullet-proofing, consisting of specially treated 10-gage steel, and shutters of same material, which can be made to envelop the entire driver compartment, it is a standard, stock Babcock Panel Body, manufactured by the H. H. Babcock Co., Watertown, N. Y. The shutters, when not in use, fold up into the roof. The portholes provided in both sides of the body, are for the use of weapons in case of attack. Ventilation is provided by special openings through the roof.



Turnover of Merchandise and Control of Stock

Knowing WHAT is Taking Place WHILE It is Taking Place

EXT to cost accounting the most important factor in the science of successful business is a rapid turnover. In fact, they are inseparably allied. A thorough study of the subject of turnover was recently made by the Domestic Distribution Department of the U. S. Chamber of Commerce in effort to bring before American business, both in the retail and wholesale branches, positive facts on better business methods.

It seems that the greatest evil practiced by American business men, is a violation of the most fundamental principle of rapid turnover—overbuying. The reasons for this tendency are manifold and apparently logical. Hence, the violation is universally flagrant, even among comparatively progressive merchants, and consequently, universally penalized by poor or complete loss of profits. Better business methods demand observance of certain iron-clad rules found correct by economists, who have studied the phenomena of business exhaustively.

The advantages of rapid turnover in business are brought out vividly in an illustrated booklet just issued by the Domestic Distribution department. This fundamental principle of merchandising is emphasized in connection with a suggested plan of stock control records designed to reduce waste and losses, due to slow movement of goods.

The department calls attention to seven separate directions in which losses may occur when merchandise is not turned

over as rapidly as it might be. These are in investment, interest, mark-down, salaries and wages, shelf and storage room, prestige and reputation and efficiency. Taking up these elements of loss in detail the booklet says:

"Invested money is the source of profit which in turn depends upon the amount of goods in stock and upon the length of time which these goods are carried. It is evident that to double the turnover comes to the same thing as doubling the amount of the stock without in any way increasing the investment. Or, vice versa, one-half as many turnovers results in doubling the amount of money generally invested for the same quantity goods.

"Interest must be paid upon all borrowed money and most merchants are borrowers. If the turnover is reduced from a period of six months to one of three months the interest on a given loan is reduced in the same proportion.

"Mark-downs are required for three principal reasons:

1. The goods have proved unsalable at the original mark-up.
2. Too many were bought and a change in the style or season left some of them on the shelves—
3. With the result that they have been soiled, chipped, bent or defaced otherwise by frequent handling.

"Salaries and wages must be included, because every operation in every establishment costs something. When an unprofitable operation is performed it represents a loss. These

losses are due to the following reasons:

1. Waste of time by management in reaching decisions as to when and what mark-downs are to take place.
2. Waste of time by sales force.
3. Rewriting tickets.
4. Rearranging goods for mark-down sales.

STYLE Art No.	BOUGHT FROM American Leather Co.	DESCRIPTION												MATERIAL Leather																																	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31															
Style A	RECD																																														
	O.M.	10																																													
	SOLD	999	1																																												
	O.O.	14																																													
Style B	RECD																																														
	O.M.	6																																													
	SOLD	1111	95																																												
	O.O.	15																																													
	RECD																																														
	O.M.																																														
	SOLD																																														
	O.O.																																														
	RECD																																														
	O.M.																																														
	SOLD																																														
	O.O.																																														
	RECD																																														
	O.M.																																														
	SOLD																																														
	O.O.																																														

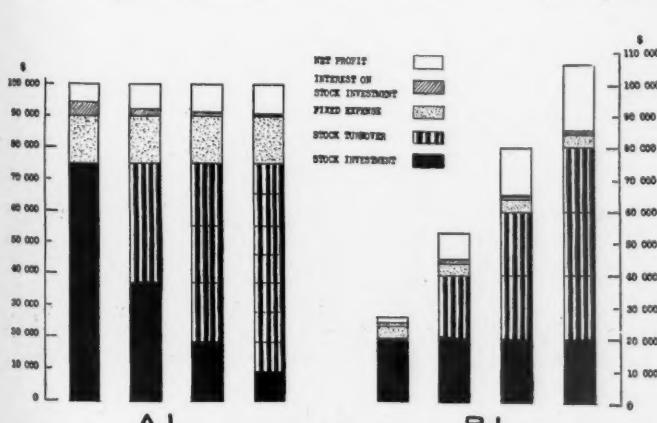
A Form of Control-Card Which Shows at Any Moment the Condition of the Stock and the Rate at Which It is Selling

"Shelf or storage room is a definite part of the expense of doing business; and that portion which is devoted to slow-selling merchandise is wasted.

"Prestige-Reputation—for the high character or timeliness of merchandise is sought by most stores. There is a distinct waste measurable in dollars and cents when the reputation of an establishment is lowered by unstylish or shopworn goods.

"Inefficiency always results in waste. The buyer whose judgment often is wrong usually makes the mistakes from lack of knowledge as to the stock and the speed or slowness with which it is moving. Frequent mistakes cause uncertainty in the mind of the one who makes them and tend to worse errors as time goes on unless some measures are taken to make them improbable.

"There is just one method of reducing this waste to a minimum. That is through records of purchases and sales which can be consulted at any moment; which will give a complete picture of the situation as it changes from week to week, from day to day, etc.; and which will supply the knowledge for immediate additional purchases, for mark-downs or for any other change in handling the stock."



Series A proves the decreased investment needed to perform a given amount of business while Series B proves the increased business and profits which accrue to the same investment upon a multiplied turnover

The booklet gives two graphs, one of which illustrates a form of control card record that has been successfully used.

The Department urges, first and foremost, the division of an establishment into departments as a means of making the keeping of records easier, and as the only method by which unprofitable departments may be reorganized intelligently.

After the departmental plan has been arranged an inventory must be made on the control-cards which are designed to exhibit every necessary fact for every day in the month.

A sample card is shown, but the exact shape and size will differ somewhat with the department or kind of business involved. The idea is adapted to the most widely differing merchandise.

"In a certain establishment the direct cost of this method of stock-control," continues the booklet, "has amounted to less than 1 per cent of the selling price. Yet it has increased the turnover considerably in all of the departments where it has been applied; and in the department where it was first installed the turnover has nearly doubled while the mark-down wastes have been more than cut in two. Not only has the number of turnovers increased but also the amount of merchandise sold in each turnover. Errors in the judgment of buyers have been made less

probable in the future as the causes and kind of errors have been made clear. Last but not least, a record of the remarks by customers shows the enhanced reputation of the stock.

"These cards constitute a perpetual inventory which displays at a glance every factor in which the management and the buyer may be interested: At what rate the goods are selling; which sizes are selling fastest; which styles are most popular; when it is time to order more; and which of the goods must be marked down. They are under the charge of one person who makes all of the entries and are mounted in an open rack. Probably the most remarkable characteristic of the control-card is the fact that changes are recorded within a quarter of an hour after they take place, so that those in authority, if it is necessary, may know the precise condition of the whole stock at any hour of the day.

"From this description it is evident with what certainty and rapidity judgments may be formed and policies may be altered."

In order to reap the benefit of the information collected in the form of figures on the control-cards, the booklet points out that there remains the necessity to condense the figures which they display in the form of a report.

"Without these reports the management

fails to secure the benefits endowed by the control-cards and the chance for immediate action is lost. Opportunities for a profitable change in policy may come suddenly and if not taken advantage of at once may disappear as quickly as they come. Control-cards are largely to provide for these sudden changes which a wide awake merchant can convert from a loss into a profit only if he has before him a picture of what is taking place.

"Two forms of report are needed:

- (a) Slow-selling Merchandise.
- (b) Quick-selling Merchandise.

"These will be considered separately because they relate to problems which are entirely distinct from each other.

(a) Slow-selling merchandise must be recognized immediately in order that the mark-down shall not be delayed beyond the proper moment and to ensure that future purchases of that class shall be made with more caution.

(b) Quick-selling merchandise should be emphasized in the minds of those who are responsible for buying and this can be done only through visualizing what has taken place by means of the actual figures and dates."

Copies of the booklet may be had by application to the Chamber of Commerce of the United States at Washington.

The Industry Needs Good Salesmen

Investigation Shows That Dealers Want Salesmen Who Are Willing to Mix Brains With Hard Work. Green Hands Preferred Because They Can be Trained and Because They Are Not Full of Pessimism

THE scarcity of good salesmen, as reported in New Orleans and several other sections of the country, prompted an investigation on the subject among the large truck dealers. Although a dearth in good selling men had been noted in various industries, it was thought that the automobile industry, and particularly the truck industry, had not suffered in this respect.

For the past few years the automobile salesmen problem has been just like the servant problem, always a thorn in the side of the truck industry. As one dealer very aptly stated, "Salesmen are like cantaloupes—you must try many before you get a good one." The success of many a dealer organization has rested on the calibre of the salesmen.

The war period undoubtedly created an abnormal condition in the salesmen field. Selling was easy. Many salesmen were needed and where the demand could not be supplied, laymen were broken in to the secrets of truck selling. Many of these men were selling motor vehicles for just two reasons—the facility of truck

sales at that time and the large commissions. No enthusiasm for the automobile industry prompted their work. That class of obstacles to progress, "the floater," crept into the selling field.

As the depression made its appearance and retrenchment began among the dealers, these men were the first to go. Others, retained for various reasons in this class, finding that hard work was the order of the day, sought other fields of endeavor.

In a way, the depression was an excellent thing for the industry—it purged the field of inefficient salesmen. But many of the good salesmen have left, whose departure will be felt most severely when truck selling is back on a normal basis.

A sales manager of one of the leading distributors of Philadelphia recently said that he has not had an application for a salesmanship position during the past month. On the other hand, he has received numerous inquiries throughout the State for good men.

One dealer, upon advertising for truck salesmen last month, received five appli-

cations in one day. Two men, old truck salesmen, proceeded to inform the dealer that the truck market today was "terrible;" that nowadays a truck sale was a physical impossibility. After listening to five minutes of "deep gloom" the dealer showed the two applicants the door.

"Why should I employ men who admit defeat before they even start work?" he told a member of his staff. Two other applicants for the position began at once to talk salary. Their demands made the dealer forget for a time that the war period had passed. They made the consideration of their applications impossible.

At the present time, dealers seem to prefer a green man to an experienced truck salesman. A green man, with real selling ability, can be taught the company's methods very quickly and does not carry the "pessimism" that has permeated the selling ranks of the truck field.

A salesman of a commodity other than a motor vehicle is often excellent material. Selling is selling in every walk of

(Continued on page 69)



EDITORIALS



Are Instalment House Methods Practical?

THE activities displayed by the motor truck industry in endeavoring to bring truck prices to a level conforming with present day lower price tendencies is commendable. Practically all of the prominent manufacturers have reduced their prices and further reductions may be expected in some quarters during the coming winter or perhaps next spring. A few are still sticking to prices which are far above the average asked for the same sized units offered by their competitors.

Price reductions alone, however, will not solve the sales problem. Simply announcing a new price will not guarantee the truck builder an increased production schedule. It helps a great deal undoubtedly in overcoming one of the chief contingencies on which most sales seem to be consummated these days. A little analyzing, however, should convince the manufacturer and the dealer that, given a price which is fair for his product and in conformity with his competitors' products, the remainder depends entirely upon the inherent quality of his product, its usefulness to the consumer, the service it will render, reputation of the manufacturer, salesmanship displayed, etc. In other words, the popular advertising phrase, "the quality will be remembered long after the price is forgotten," should be the principle upon which the sale of every motor truck should be executed. Price should never be the first consideration in the sale of any article. The experienced salesman usually keeps this until last.

Therefore the price of any article should not simply be the means to an end, as in the case of a truck manufacturer who first of all announces a price reduction and at the same time offers to sell his truck at nothing down and a year to pay. We cannot conceive how a truck manufacturer can expect to interest a prospect when he believes its value by offering to sell it without at least a small deposit. Furthermore, such a proposition is not destined to attract the best class of customers. Any manufacturer or dealer who sells under such a policy is only helping to increase the number of used trucks on the

market. He will wake up some morning and realize that he has been hiring trucks to his customers instead of selling them. Hasn't the "pay as you earn" policy caused enough damage to the truck industry, because trucks were purchased by individuals who hadn't enough business acumen to make them pay after they got them?

Even the modern installment house extracts enough cash at the time of sale to nearly pay the cost of the articles purchased. Does the average merchant, in any line of business, offer to sell two or three thousand dollars' worth of goods to a customer with a year's time to pay? He doesn't try to force sales that way. His own common sense tells him that he cannot continue in business and hope to build up a reputable clientele with such merchandising policies. It is not our purpose to depreciate time payment or financing plans of any legitimate sort, but we cannot see the wisdom of selling trucks without at least obtaining a fair sized deposit with the order, the greater amount—the better.

We Say It Can be Done

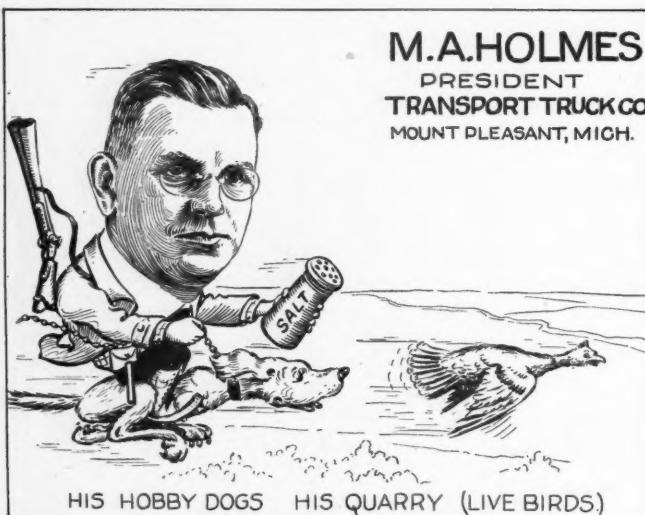
THIS publication has repeatedly advocated within the past two years that the truck dealer can increase his profits by selling truck equipment. The line he should carry depends entirely upon his territory and the conditions under which most of his trucks operate. His market in this field is not limited to his own line of trucks, but extends to competitive makes. As a matter of fact, however, the average dealer is reluctant to enter the equipment sales business. Naturally he has a reason for side-tracking this remunerative field, because selling the complete chassis was more profitable.

The lessened demand, however, for trucks has caused many dealers to consider the sale of truck equipment more seriously, so that we feel that the leading article on "Selling Winter Equipment" in this number, is most timely and that it will give those dealers who are considering this field some concrete information on the establishment of a Truck Equipment Department.

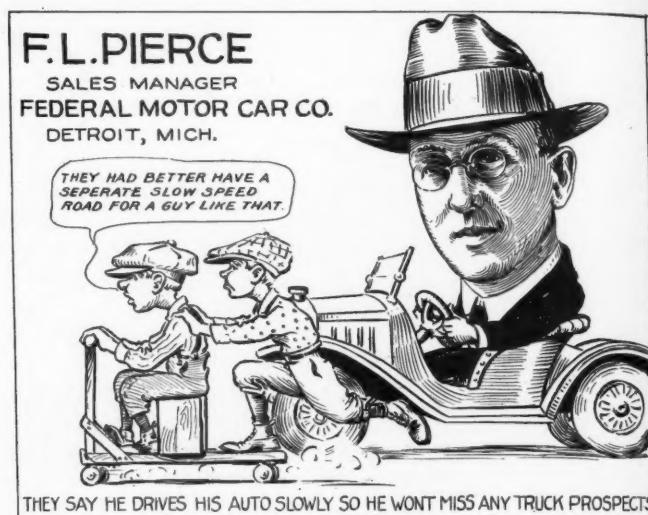
**WINTER MEANS BUSINESS!
ARE YOU PREPARED TO GET YOUR SHARE?**



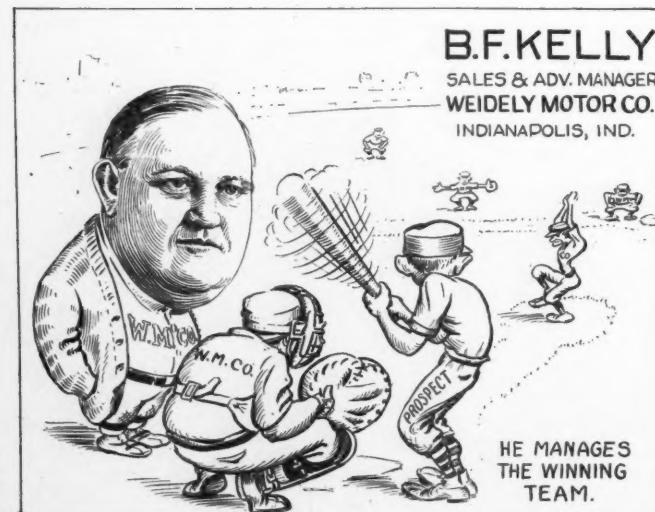
FRIENDLY TIPS ABOUT SOME "BIG ONES"

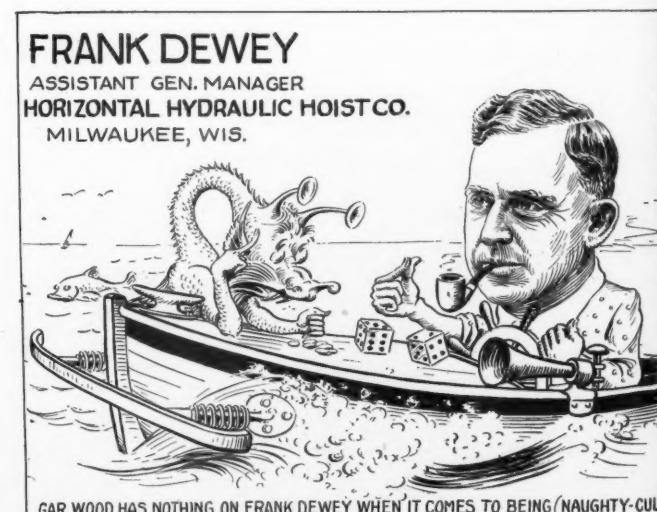
M. A. Holmes—Born in Horton, Mich., 1879. After leaving school entered the retail farm implement and carriage business. Spent four years with American Seeding Machine Company of Springfield, Ohio, as commercial traveler, two more as District Manager and two additional years as special representative in the jobbing business for this company. For two years he was General Sales Manager of the Republic Motor Truck Company, and for two more Vice President and General Sales Manager. About three years ago Mr. Holmes organized the Transport Truck Company, Mount Pleasant, and since that time has been its President and General Manager.



F. L. Pierce—Has been identified with automobile industry for about fifteen years. Prior to present connection was with Regal Company for nine years. Three years ago became connected with the Federal Motor Truck Company, Detroit, as Sales Manager, which position he still holds.



B. F. Kelly—Born 1888 at Indianapolis. Entered automobile business with local Buick agency in 1907. Then went with the old Overland Auto Company, Indianapolis, as Assistant Purchasing Agent. Then went to Willys-Overland Company, Toledo, as Purchasing Agent in 1909. Next position was with National Acme Company of Cleveland, and after a number of years went to look after the interests of Bernard E. Griffey Supply Company of Indianapolis, of which concern he is President. In May, 1919, went with Weidely Motors Company as Director of Sales. Mr. Kelly also organized the Parts Corporation of Indianapolis, of which concern he is Vice President and General Manager.



Frank Dewey—First took course in mechanical engineering, Virginia Polytechnic Institute. Then became associated with American Tobacco Company and American Planigraph Company, New York City, on special machinery designing. Attached to navy yards several years, first California, then Norfolk Navy Yard, designing ordnance material, especially gun turret machinery, later developing, testing and manufacturing naval defense mines. Later joined Packard Motor Car Company and organized truck special equipment department. Then joined Horizontal Hydraulic Hoist Company, establishing the Detroit branch. At present is Assistant General Manager of above company, located at the factory, Milwaukee, Wis.

News of the Trade in Brief

War Time Waste Still Clogs Trade, Says Moock

CINCINNATI, O., Oct. 3—Not more business but better methods was the chief subject discussed by Harry G. Moock, general manager of the National Automobile Dealers' Association, with headquarters at St. Louis, Mo., who was the guest of the Cincinnati Automobile Dealers' Association at the October trade revival meeting here.

Mr. Moock declared that concentrated effort in locating waste resulting from extravagant habits contracted in the hilarious days following the war would result in amazing developments if merchants would make close examination. This, he said, applied not only to the automobile

dealer, but also to all other merchants.

Better service, not the mere desire to use the term to attract attention, but courteous, prompt, economical attention to the customer's wants will do much toward establishing good will and character building in business; without which no business house can succeed.

Speaking of the legislative and tax situation, both nationally and state-wide, he stated that the taxes paid by the automotive industry, based on the 1920 compilations, amounted to the enormous sum of \$366,720,878. In fourteen states, however, there is now a gasoline tax being paid by motorists, adding to the already heavy burden some \$6,000,000. The greater the tax the greater the sales resistance.

Three Steel Companies Consolidate

Steel mill properties with combined assets in excess of \$20,000,000 have been brought together in the merger just completed of the Central Steel Co., the National Pressed Steel Co., and the Massillon Rolling Mill Co., all of Massillon, O.

The new corporation, it is announced, takes the name of the Central Steel Co., and the following officers have been elected: Chairman of the board of directors and president, R. E. Bebb; 1st vice-president, F. J. Griffiths; 2nd vice-president, C. C. Chase; 3rd vice-president, H. M. Naukle; secretary and treasurer, C. E. Stuart.

The firm will be in a position to do extensive work for the automobile industry.

SHOWS

October 15 to 22, 1921—St. Louis, Mo. St. Louis Automobile Exposition, auspices of St. Louis Auto Mfrs. and Dealers' Assn., Chevrolet Motor Co. Bldg. (125,000 sq. ft.). Passenger Cars, Trucks, Used Cars and Accessories. Robert E. Lee, Mgr., 3124 Locust St.

October 17 to 22, 1921—Jackson, Miss. Auto Show at the 18th Annual State Fair, Auto Bldg. and tents. Mabel L. Stire, Box 55, Sec.

October 18 to 21, 1921—Raleigh, N. C. Automobile exhibit at the 60th Annual State Fair at Fair Grounds, auspices of North Carolina Agricultural Society. Passenger Cars, Trucks, Tractors and Accessories. Jos. E. Pogue, Sec., Raleigh.

November 11 to 19, 1921—Little Rock, Ark. Fourth Annual Show, auspices of Arkansas Automotive Assn., State Fair Grounds. Passenger Cars, Trucks and Accessories. A. W. Parke, P. O. Box 699.

November 14 to 19, 1921—Jersey City, N. J. 2nd Annual Jersey City-Hudson County Automobile Show, at the 4th Regt. Armory, under auspices of Hudson County Automobile Trade Assn., Passenger Cars, Trucks and Accessories. Fred W. Payne, Mgr., 342 Madison Ave., New York City.

November 14 to 19, 1921—Chicago, Ill. Annual exhibit of the Automotive Equipment Assn., at the Coliseum. Accessories and Equipment.

November 28 to December 3, 1921—Des Moines, Ia. Fourth Annual Tractor Show, auspices of Iowa Implement Dealers' Assn., at Coliseum. Trucks, Tractors and Power Farming Machinery. T. F. Wherry, Mgr., 664 38th St.

January 7 to 14, 1922—New York City. Annual Automobile Show of the National Automobile Chamber of Commerce, at Grand Central Palace. Passenger Cars and Accessories.

January 9 to 20, 1922—New York, N. Y. First Annual Retail Dealers' Auto Equipment Show, at Hotel Imperial, auspices of National Retail Merchants' and Buyers' Assn. Accessories and Automobile Clothing. George T. Keen, Sec., Hotel Imperial.

January 19 to 25, 1922—Milwaukee, Wis. Annual Automobile Show of the Milwaukee Automotive Dealers' Assn., Auditorium (100,000 sq. ft.). Passenger Cars, Trucks and Accessories. Bart J. Ruddle, 316 Brumler Bldg.

January 28 to February 3, 1922—Chicago, Ill. Annual Automobile Show of the National Automobile Chamber of Commerce, at the Coliseum.

January 30 to February 4, 1922—Minneapolis, Minn. National Tractor Show, held annually.

January 30 to February 4, 1922—London, Ont., Canada. Second Annual National Motor Show of Western Ontario, Armory and temporary buildings, auspices of Automotive Retailers' Assn., London, Ont. Passenger Cars, Trucks, Tractors, Accessories, Motor Cycles and Bicycles. T. C. Kirby, Tecumseh Hotel.

Coming Events

February 3 to 10, 1922—Minneapolis, Minn. Fifteenth Annual Automobile Show, auspices of Minneapolis Auto Trade Assn. Passenger Cars, Trucks and Accessories. W. R. Wilmot, 709 Andrus Bldg., Minneapolis.

February 6 to 9, 1922—Scranton, Pa. Annual Truck Show, under the auspices of the Scranton Motor Trades Assn., Armory (50,000 sq. ft.). Hugh B. Andrews, Mgr., 411 Board of Trade Bldg.

February 6 to 11, 1922—Winnipeg, Canada. Second Annual Automotive Equipment Show, auspices of Western Canada Automotive Equipment Assn., Board of Trade Bldg., Auditorium. W. L. Williams, New Stovel Bldg., Winnipeg.

February 11 to 18, 1922—San Francisco, Cal. Sixth Pacific Automobile Show, auspices of Motor Car Dealers' Assn. of San Francisco, at Exposition Auditorium (70,000 sq. ft.). Passenger Cars, Trucks, Tractors and Accessories. G. A. Wahlgreen, 215 Humboldt Bank Bldg., Mgr.

February 14 to 17, 1922—Philadelphia, Pa. 21st Annual Exhibit and Convention of the Pennsylvania and Atlantic Seaboard Hardware Assn., Inc., at the Commercial Museum. Automobile Accessories, etc. Sharon E. Jones, Sec., 1314 Fulton Bldg., Pittsburgh, Pa.

February 20 to 25, 1922—Duluth, Minn. Seventh Annual Show of Duluth Auto Trade Assn., Duluth Armory Bldg. (70,000 sq. ft.). Passenger Cars, Trucks, Tractors and Accessories.

February 20 to 25, 1922—Deadwood, S. Dak. Tenth Annual Black Hills Auto Show of the Deadwood Business Club, Auditorium. Passenger Cars, Trucks, Tractors and Accessories.

February 20 to 25, 1922—Louisville, Ky. Fourteenth Annual Automobile Show, Jefferson County Armory (54,000 sq. ft.). Passenger Cars and Accessories. George T. Holmes, Inter-Southern Bldg.

February 27 to March 2, 1922—Bethlehem, Pa. Seventh Annual Truck Show of Bethlehem Auto Trade Assn., Coliseum. Trucks, Tractors and Accessories. J. L. Elliot, Mgr., 1308 Norway Pl.

February 27 to March 4, 1922 (tentative date)—Atlanta, Ga. Second Annual Great Southern Automobile Show, auspices of Atlanta Automobile Assn., Auditorium Armory. Passenger Cars, Trucks and Accessories. Virgil W. Shepard, 305 Connally Bldg., Show Mgr.

March 11 to 18, 1922—Boston, Mass. Twentieth Annual Automobile Show of the Boston Automobile Dealers' Assn., Mechanics Bldg. (125,000 sq. ft.). Passenger Cars, Trucks, Tractors and Accessories. Chester I. Campbell, Mgr., 5 Park Sq.

CONVENTIONS

Atlantic City, N. J., October 19 to 22, 1921—Fourth Annual Meeting and Exhibition of the Automobile Accessories Branch of the National Hardware Association of the United States, at the Million Dollar Pier. T. James Fernley, Sec., 505 Arch St., Philadelphia, Pa.

Chicago, Ill., November 14 to 19, 1921—Annual Convention and Business Exhibit of the Automotive Equipment Assn., at the Coliseum.

Chicago, Ill., January 17 to 20, 1922—Annual Convention and Exhibit of the American Road Builders' Assn., at the Coliseum. Address Sec., 11 Waverly Pl., New York City.

Chicago, Ill., January 30 to 31, 1922—Fifth Annual Convention of the National Automobile Dealers' Assn., La Salle Hotel.

Cleveland, Ohio, October 18 to 20, 1921—Convention and Exhibit of the National Tire Dealers' Assn., Hotel Winton.

Columbus, O., December 14 to 16, 1921—Fifth Annual Convention and Exhibit of the Ohio Automotive Trade Assn., Memorial Hall and the Elk's Home. E. J. Shover, Secy-Mgr., 403 Central National Bank Bldg., Columbus.

El Centro, Calif., October 17 to 18, 1921—Southern Division Meeting of the California Automobile Trade Assn.

Elkins, W. Va., November 8, 1921—Semi-Annual Meeting of the West Virginia Automobile Dealers' Assn.

Greenville, S. C., December, 1921—Semi-Annual Meeting, South Carolina Automotive Trade Assn.

New York, N. Y., January, 1922—Final Meeting of the Automotive Wood Wheel Manufacturers' Assn.

New York, N. Y., November 22, 1921—Convention of the Factory Service Managers, National Automobile Chamber of Commerce. Address, Marlin-Rockwell Bldg., Madison Ave. & 46th St., New York City.

New York, N. Y., January 11 to 14, 1922—Annual Meeting of the Society of Automotive Engineers, Engineering Society Bldg.

Oakland, Calif., October 24 to 29, 1921—International Traffic Officers' Assn. Convention.

Trenton, N. J., May, 1922—Annual Convention of the New Jersey Automotive Trade Assn. H. S. Moore, Sec.-Treas., Trenton.

FOREIGN EVENTS

Brussels, Belgium, December 3 to 15, 1921—Annual Belgian Automobile Show.

London, England, October 13 to 23, 1921—Olympic Commercial Car Show.

Santiago, Chile, March, 1922—Annual Automobile Show.

Shanghai, China, November, 1921—First Annual Automobile Show.

Service Movement Grows During Year

Seven new automotive service associations have been formed during the past year with the aim of promoting the welfare of the car owner by raising the standards of repair work and by discouraging service stations that engage in unfair practices.

The growth of motor transport to a point where over 9,000,000 vehicles are on the road, has called for a corresponding increase in the science of the care of these vehicles. Certain individual companies have developed an efficient service policy, but local co-operation of service men for the sake of maintaining standards is comparatively new.

Service station men have found it desirable to have an association which will fight the irresponsible repair shop whose sole interest is to "gyp" the public. The shop of unfair standards can make unnecessary repairs, use inferior parts and indulge in other practices immediately profitable, but in the long run damaging to the entire business. If any one service man protests against such practices by a rival he is likely to be accused of trade jealousy. A service association, however, can help protect the public and the good name of the trade.

Service associations also make for efficiency in repairs. They permit a study of the local situation and the exchange of ideas on economical repair methods.

The seven new associations formed this year are: Worcester and Springfield, Mass.; Syracuse and Buffalo, N. Y.; Hartford, Conn.; Pittsburgh, Pa., and Charlotte, N. C. Other associations already established are: Automotive Service Association of Baltimore; Automotive Service Association of Brooklyn; Automotive Service Association of Denver; Automotive Service Association of Indianapolis; Northwest Automotive Service Association, Minneapolis; Automotive Service Association of Newark; Automotive Service Association of New York, N. Y.; Motor Maintenance Association, Omaha, Neb.; Kings County Automotive Trades Association, Seattle, Wash.

August Truck Exports Show Increase

Truck exports were slightly higher in August over those of July, according to Domestic Export bulletin compiled by the Bureau of Foreign and Domestic Commerce. During August the U. S. shipped 241 completed cars, valued at \$268,691, and 140 chassis at \$165,361, while July exportation shows 204 finished cars, at \$177,247, and 135 chassis at \$136,990. Mexico again leads the field, having received in August 98 completed trucks costing \$75,831 and 33 chassis at \$17,820, with Canada second with 50 finished and 39 unfinished trucks. England is third with 37 completed and 12 uncompleted trucks. This is an increase for England for the month of July shows no completed cars and only ten chassis received.

Bosch Has Big New Building in New York

The new Bosch Building, which stands at 17-19-21-23 West 60th Street, Columbus Circle, has ten stories and mezzanine, and is thoroughly modern in every detail. It is of fireproof construction, being built of steel, stone and concrete throughout.

The American Bosch Magneto Corporation will occupy four complete floors, their quarters constituting perhaps the most elaborate automobile electrical sales and service station in the United States. A large service station and installation garage will be located in the basement, and the sales and stock room, which will occupy the ground floor, will be spacious and especially well laid out, with high ceilings and large show windows. Part



New Bosch Building

Located in the heart of the automobile district of New York City. Devoted strictly to automotive affairs

of the service equipment in this building is a truck elevator which is one of the largest and most powerful automobile lifts ever built.

It is the intention of the Corporation to rent the upper floors of the building exclusively to automotive concerns and retain an atmosphere of motordom throughout the handsome structure.

Black & Decker Introduce Credit Plan

A national credit system, making it possible for any reliable person in the United States and Canada to purchase electric motor-driven shop equipment on six-months terms without any extra cost has been introduced by the Black & Decker Mfg. Co., Baltimore, Md., makers of portable electric drills, grinders, etc. Black & Decker products are sold entirely through jobbers, and the new service enables customers to pay 23 per cent of the regular price of the item in cash and the balance in six monthly payments.

Jobbers are furnished with printed forms which are conditional sales agreements. The drill company will accept half the responsibility with the jobber for the fulfilment of the sales agreement.

Uniform Laws Will Curb Truck Hazards, Says Fenner

BOSTON, MASS.—Motor truck transportation can be made far more safe by the adoption of uniform scientific traffic laws in all the states, and by stricter enforcement of the statutes, in the opinion of D. C. Fenner, chairman of the Motor Vehicle Conference Committee and manager of the Public Works Department of the International Motor Co., speaking before the New England Conference of State Highway Commissioners and Motor Vehicle Registrars. The conference of the commissioners was held in connection with the Annual Congress of the National Safety Council.

Mr. Fenner stated that careful analysis of accidents in which motor trucks have figured has revealed the fact that the disasters have usually arisen from excessive size, weight or speed of the vehicles; from overloading or from inadequate or defective equipment. Still other causes were reckless or incompetent operators, improper enforcement of the laws and conflicting traffic regulations as between states or the municipalities within the states.

After citing instances to illustrate the manner in which these causes of accidents have operated disastrously, he recommended to the highway commissioners and motor vehicle registrars that they lend their support to the movement which has been begun to bring about the general enactment and enforcement of uniform motor vehicle laws throughout the entire United States. In this connection he explained those provisions of the Proposed Uniform Vehicle Law which have a vital bearing on those factors, and showed how the adoption of the measures recommended would make for safety.

He concluded by emphasizing to public officials that motor transportation is an increasingly important medium of commerce, that its development is today only in its infancy, and that the wisest course for everyone to pursue is to develop sound and equitable regulations for rendering this new type of transportation safe and not measures for stifling its legitimate and vitally necessary growth.

Automobile Executive Now Director of A. M. E. A.

The interest of the automotive industry in foreign trade was emphasized when J. Walter Drake, chairman of the Foreign Trade Committee of the National Automobile Chamber of Commerce, was elected October 6 a director of the American Manufacturers' Export Association.

The scope of Mr. Drake's activities in the past have gone beyond the defined line of the automotive field into affairs of United States foreign trade as a whole. It is Mr. Drake's opinion that American automobile export trade can best expand if the United States commerce in general increases abroad, and that any policy benefiting one American industry will, in the long run, also prove advantageous to other branches of United States business.

Desires Enforcement of Over-loading Laws

Believing that a very large number of accidents are caused by over-speeding of motor cars and motor trucks, coupled with the over-loading of the latter, the N. A. C. C. is calling upon police officials of the country for a more strict enforcement of the traffic laws, of which there are a sufficient number on the books, but the provisions of which have been too generally disregarded.

Reports show that over-loading of trucks of all sizes have in some cases harmed the roads and in other cases have overcome even the powerful brake equipment, resulting in accidents that could have been avoided.

While it is true that the speed craze has long since died out, there are still many who travel at excessive rates, who disregard the rights of others on the highways and who fail to take proper precautions at the intersection of roads and railroads.

The N. A. C. C. believes that a two-ton truck carrying four tons is more dangerous on the highways than a five-ton truck with its normal load of five tons. It endorses the Pennsylvania law which requires each truck to bear a lettering showing its weight, the body weight and the weight of the load which it should carry. The Chamber opposes truck bodies of abnormal size and advocates loads which will conform with the recommendations of automobile and highway engineers for one inch width of tire for each 800 lbs. of weight.

Lack of Space Handicaps Automotive Exhibit

Viewed from an automotive standpoint the annual New York electrical show, September 21 to October 8, was not as interesting as the 1920 event. This was largely due to the show being held this year in the 71st Armory, where space is limited as compared with Grand Central Palace.

Electric vehicle manufacturers were represented, there being five truck and one passenger maker. The Ward Motor Vehicle Co., Mt. Vernon, N. Y., displayed one of its 1-ton chassis, also a rear axle with housing cut away to display the worm gear used by this company on its

product. Other truck makers were the Walter Motor Truck Co., Commercial Truck Co., Walker Vehicle Co. and the Lansden Co. Rauch & Lang was the only passenger car maker exhibiting.

Two storage battery concerns had displays, one showing all types. There were few electric tools shown. Last year there was a large number of the various applications of electricity in the service station, garage and repair shop.

Gill Holds Fourth Annual Sales Convention

Sales representatives of the Gill Mfg. Co. from all over the country gathered at Chicago, September 19-22, for the fourth annual convention, which came as a fitting climax to a remarkable sales record for the first eight months of this year, during which period the sales of the Gill company ran 46½ per cent higher than for corresponding period of 1920.

Little wonder, therefore, that the 150 sales representatives—which included 39 branch managers and members of their sales organizations, together with the factory sales department—participated enthusiastically in a two days' merchandising and business program that put them on their toes ready to tackle the future with renewed energy and force.

The entire convention program was planned to give the men the most concrete kind of help in meeting their every day business and sales problems in the field, and results should be far reaching in actual sales records during coming year.

Addresses were made by President E. P. Chalfant, General Manager E. J. Smith, C. A. Musselman, of the Chilton Co., and others, and at the annual banquet, held at the Beverly Hills Country Club, Harry S. Spillman, of the Personality Bureau, of New York, gave the piston ring men a rousing talk that they will not soon forget.

This company has been manufacturing the well known Gill piston ring since 1916. From a small beginning this company has developed rapidly. Now it has 39 branches and a sales organization covering the United States very thoroughly. It is enjoying an excellent export business also. Its history shows a remarkable growth with each succeeding year, and its future is very bright indeed.

Road Convention for Chicago

In view of the fact that road building now forms the major part of the construction industry, the announcement of the Board of Directors of the American Road Builders' Association, that its next annual convention and good roads show will be held in Chicago, Ill., on January 17, 18, 19 and 20 is of particular interest. More than one billion dollars is now available for highway work in this country and legislation now pending before Congress undoubtedly will be passed, adding many millions more to this account.

In addition to the papers and discussions on important highway problems by leading road builders of the country, the exhibition of road machinery will be an extremely valuable feature. During the past decade, road building methods have been revolutionized by the introduction of labor saving machinery. In 1919, the last year for which figures are available, more than \$100,000,000 worth of road machinery was manufactured, according to the U. S. Department of Commerce. This is greater than the value of all other construction machinery produced in that year and shows the relative importance of the road building industry.

With the central location of Chicago, the immense amount of road money available, and the increased interest in road matters, the directors of the association are of the opinion that the coming convention and show will surpass any previously held and that highway engineers, contractors and officials will attend in greater numbers than ever before.

Elgin Desires Duty Company

The Elgin, Illinois, Association of Commerce, has paid \$7500 for a tract of land south of the city which will be presented to the Duty Motor Truck Co., which agreed to remove its plant from Greenville, Ill., if a suitable site was donated. Under the terms of the deal, the deed to the land is not to be delivered to the truck company until the buildings are erected and the plant is in actual operation. One hundred and fifty residents of Elgin invested in stock in the company. It is hoped to have the buildings completed by spring.



Branch Managers, Members of the Sales Organization and Guests Who Attended the Annual Sales Convention of the Gill Manufacturing Company, Chicago, at the Chicago Beach Hotel

Chamber of Commerce Urges Employment Co-operation

An appeal to business men and chambers of commerce the country over to give active support to the emergency program for the relief of idle workers, as advanced by the national conference on unemployment, is made by Joseph H. Defrees, president of the Chamber of Commerce of the United States and a member of the conference.

Mr. Defrees especially urges that business men get behind the plan proposed by the conference for the mayors to organize local emergency committees in their communities. He asks them to offer the mayors immediate assistance of the business organizations in order that the machinery of organization shall be speeded up on a national basis. Every town, says Mr. Defrees, has a responsibility to the nation to organize to meet this question immediately, and the nation can only bring its help to bear when the cities and states are organized so as to make their help effective.

"Business," says Mr. Defrees, "has a very great responsibility in the situation. It furnishes employment. Business men in the communities should take the lead in co-operating with the mayors in creation of the emergency committee and in working out constructive community programs for relieving unemployment in their vicinities.

"The situation cannot be met without proper organization. It is primarily a community problem. The local business man, through his business organization and individually, should make every effort to meet the situation in this city.

"The existing unemployment presents a real problem which must have immediate attention."

Highway Fellowships at the University of Michigan

The University of Michigan at Ann Arbor, Mich., has always taken the lead in emphasizing the importance of highway transportation by offering courses in this modern subject. The work has attained great success lately under the able direction of Arthur H. Blanchard, professor of highway engineering and highway transport.

The school's latest contribution will be a number of fellowships to be awarded by the Board of Regents not later than November 1, 1921. These fellowships are as follows:

The Roy D. Chapin Fellowship in Highway Transport, which is offered to provide for the investigation of an approved subject relative to Highway Transport.

The Roy D. Chapin Fellowship in Highway Engineering, which is offered to provide for the investigation of an approved subject relative to hard surfaced roads and pavements.

Two Detroit Edison Fellowships in Highway Engineering, which are offered to provide for the investigation of approved subjects relative to moderate cost country roads.

General Conditions: Each Fellowship pays the sum of \$250 with an allowance of \$50 for expenses. The holders of these Fellowships do not have to pay tuition fees. A Fellow must hold a Bachelor's Degree from a college of recognized standing. He must enroll as a graduate student in highway engineering or highway transport and as a candidate for the degree of Master of Science or Master of Science in Engineering. He must be in residence for one of two semesters. An application must include a concise statement of the candidate's educational training and engineering experience, and three references. Applications and requests for information pertaining to the twenty-five advanced courses offered by the Graduate School should be sent to Arthur H. Blanchard, University of Michigan, Ann Arbor, Michigan.

"High Spots" of the Convention

A Summary of the Sentiment Expressed by Over 200 Leading Executives

1. The tide has turned. Better business is at hand.
2. The automotive industry has learned to regard itself and conduct itself as a transportation industry, selling America an indispensable utility.
3. "Dream of Ease, but Work Like Hell" selling strategy slogan offered by Vice President W. O. Rutherford.
4. The automotive industry must develop the unconquered markets right before it. For example, production of motor buses to meet immediate city and interurban transportation requirements will alone take up the slack in the truck field.
5. In figuring a sound "normal" for the motor industry, we must regard 1913 as last year; plus eight years of national progress.
6. Stability of automotive industry demonstrated by orderly character of deflation and harmonious adjustment during the twelve trying months just closed.
7. Improvement in banking and credit situation and greater friendliness of financial interests toward the industry; marked improvement in collections generally, as well as reduction in volume of outstanding notes and acceptances.
8. Improvement in labor efficiency, likelihood of progress in taxation and tariff situation, and stabilization of sound price levels in the raw material field.
9. Greater efficiency within the industry as a result of searching self examination, stock-taking, reorganization and liquidation of inventories. Greater attention is being given to quality of product and service, and the interests of the consumer and the general public, as a result of stimulation of competitive competition.
10. Realization that the automobile industry must go forward and will go forward as long as America in particular and the world in general require transportation.

New York City on Brink of New Transportation Era

"The world is just awakening to the manifold advantages of highway transportation," declared F. W. Fenn, secretary of the National Motor Truck Committee, National Automobile Chamber of Commerce, in discussing the present trend in transportation. "This is manifested in a striking manner in the reports which reach our office from all parts of the country on the decline of the horse, the backbone of the transportation fabric for many years. Registered stallions in Wisconsin decreased from 2437 in 1918, to 1688 in 1920. In the state of Michigan they decreased from 1288 in 1918, to 1068 in 1919. Ohio had 965,000 horses in 1917, and 862,000 in 1919. It is little surprising therefore to discover that the Board of Health's horse census, which will be released shortly, will show that there are today in New York City approximately 10,614 less horses and 1784 fewer stables than in 1919. Only recently one hundred and sixty horses were sold in Portland, Ore., for chicken feed.

"The big problem today on the streets of New York is to keep the traffic moving. The element of time has become the pivotal point in the study of operation costs. In the opinion of W. D. Williamson, an engineering expert, traffic congestion can be traced invariably to slow moving horse-drawn vehicles which retard the fast motor traffic; the horse-drawn vehicle will by the very nature of things therefore be it rarely seen as the bullock wagon. Reductions in general will follow through the opportunity to reduce stables, which are always more or less unsanitary no matter how carefully supervised; to get by congested traffic quicker; to turn around in crowded thoroughfares."

Reductions Continue in Truck Field

Since the last issue of The Commercial Car Journal a large number of truck manufacturers have joined the price reduction class, realizing that such a step was necessary to place the truck business on its former stable basis.

In many cases these reductions have been made with a sacrifice to the manufacturer, but as the basic industries improve and labor adjusts itself these reductions are beginning to justify themselves. Although the drops ranged from 1 to 20 per cent on the various models, the reductions average about 8 to 10 per cent.

Among the manufacturers reducing were the Thomart Motor Truck Co., the Iowa Motor Truck Co., the Cyclone Motor Corp., the Defiance Motor Truck Co., Facto Motor Trucks, the Wilson Truck Manufacturing Co., Hal-Fur Motor Truck Co., Jackson Motors Corp., Oneida Motor Truck Co., the Standard Motor Truck Co., the Gramm-Bernstein Motor Truck Co., the Sterling Motor Truck Co., the Bell Truck Sales Corp., Atterbury Motor Car Co., Rainier Motor Corp., Triumph Truck & Tractor Co., Vim Motor Truck Co. and the Kissel Motor Car Co.

Personal Items

P. E. Bates, for the past five years affiliated with the Mohawk Tire & Rubber Co., of Akron, will become district manager for Northern Ohio of the India Tire & Rubber Co., of Akron, O.

George E. Bodwoin has been sent by the American Hammered Piston Ring Co., of Baltimore, to Europe to look after the company's gradually increasing export business.

F. B. Bradley has joined the sales force of D. A. Sanders, 66 S. Broadway, Nyack, N. Y., automotive equipment and supplies.

C. B. Chamberlin, well known in the truck and passenger car field, will head his own organization, the Cincinnati Machine Products Co., of Cincinnati, a firm to do precision work and to make pins and bolts for the automotive industry. He was recently with the United States Motor Truck Co.

W. B. Clowes, assistant sales manager of the Eisemann Magneto Corp., has resigned. He is to be succeeded by O. S. Stanley, formerly assistant service manager of the American Bosch Magneto Corp.

S. F. Dupree, Jr., formerly of Caskey-Dupree Mfg. Co., of the Automotive Products Co., has joined the Universal Drive Shaft Co., Cleveland, O., as vice-president. He will direct all sales and service.

Richard C. Fowler, formerly assistant sales manager of the Delco Light Co., in Dayton, O., is now vice-president of Campbell, Trump & Co., 1830 Penobscot Bldg., Detroit.

William H. Herbert has been announced as general sales manager of the Denby Motor Truck Co., Detroit. He succeeds L. B. Graham, who has resigned.

E. T. Herbig, sales manager of the Service Motor Truck Co., of Wabash, Ind., and previous to that advertising manager, associating with the company for five years, has taken a position in a special sales capacity with the General Motors Truck Co.

Oliver H. Hunter has assumed his duties as field secretary of the Pennsylvania Rubber & Supply Co., 2819 Prospect Ave., Cleveland, O. Formerly manager of the Erie branch.

U. G. Lyons, of Warren, Pa., was elected president of the National Petroleum Association at the convention at Atlantic City, N. J., September 23.

Ralph C. Matthiesen, president of the Motor Haul Age Co., of New York City, has been appointed to be a special assistant to postmaster general to reorganize postoffice motor transport service.

A. C. Maucher, of the Standard Steel Car Co., of Pittsburgh, has resigned to become general manager of the Ray Battery Sales Corp., of 1926 Broadway, New York City, distributing the Ray battery in eastern New York and northern New Jersey.

W. R. McCulla has been appointed district manager of the Asbestos & Rubber Works of America, Inc., 1821 Broadway, New York City, also the Bijur Motor Appliance Co., of Hoboken, N. J., and will have charge of the manufacturers' sales for the Detroit and Cleveland territory, with offices at 58 Garland Bldg., Detroit.

Edward O. McDonnell has assumed his duties as general manager of the Kelly-Springfield Motor Truck Co., of Springfield, O.

George B. Nason, of the advertising department of the Champion Spark Plug Co., Toledo, has assumed the duties of advertising manager, succeeding H. L. Corey, who has resigned to join E. B. M. Wortman in an advertising agency in Utica, N. Y.

H. E. Rice, commercial manager of the Atwater-Kent Mfg. Co., has resigned to become associated with the American Bosch Magneto Corp., as assistant to Arthur T. Murray, president.

L. K. Rittenhouse succeeded L. I. Ris as eastern district manager of the Star Rubber Co., 226 West 52nd St., New York City. Mr. Rittenhouse brings 14 years of experience in the rubber industry to his new position.

Charles L. Shedd is the new manager of the Detroit branch of the American Bosch Magneto Corp., replacing Roy Davey, who has been moved to the factory offices at Springfield. Mr. Shedd was at one time promotion manager, truck division, Packard Motor Car Co., and later sales manager of the Republic Truck Corp.

Olin R. Smith, who for three years has been advertising manager of the Moto-Meter Co., Inc., Long Island City, has joined the staff of the Palmer Advertising Service, 137 E. 43rd St., New York City.

R. H. Spencer has been placed in charge of truck distribution of Latham Davis & Co., Inc., of San Francisco, distributors of the Kissel.

New Incorporations

The Safstrom Manufacturing Co. has been incorporated at \$30,000 in Chicago to manufacture and deal in automobile parts, accessories and tools.

The Victor Bearings Co. has been incorporated at \$300,000 to take over the properties of the Modern Die & Tool Co., Indianapolis. Work is soon to begin on a \$50,000 factory building.

The Champion Porcelain Co., capitalized at \$750,000, has been organized by the Champion Spark Plug Co. at Toledo, to absorb the business of the Jeffery DeWitt Co., of Detroit.

The Electric Battery Service Co., Peoria, Ill., has been incorporated with a capital stock of \$15,000 and will be located at 706 Main St. The incorporators are A. S. Pierce, H. F. Gee, Dwight Orr and R. C. Orr.

The Universal Roller Bearing Corp. has been organized at Norfolk, Va., to manufacture roller bearings. Capitalization \$500,000.

Factory News and Capital Increases

The Gordon Tire & Rubber Co., of Canton, O., has been released from receivership and has assumed operations. The present equipment is sufficient for operations and is in good condition, the court was told.

The Gary Motor Truck Co., of Gary, Ind., is effecting an amalgamation with the Chase Tractor Co., of Toronto, with a combined capital of \$2,000,000.

Raybestos Co., of Bridgeport, Conn., has increased its capital stock from \$3,000,000 to \$8,000,000. The increase was made to finance the purchase of the General Raybestos & Rubber Co., of Charleston, S. C.

The Mason Tire Corp., of New York City, has declared its semi-annual dividend of 4 per cent on preferred stock. Sales of the firm for the first six months of 1921 were greatly in excess of those for the similar period of 1920.

The American Railway Express is asking all shippers for their co-operation in putting over the "Perfect Package Month" campaign during November. Shippers can greatly aid by exercising the greatest care in addressing and preparing packages for shipment.

The Mifflinburg Body Co., of Mifflinburg, Pa., due to a rapid increase in commercial body business, has found it necessary to erect a three-story brick building, 62 x 200. The factory already occupies a quarter of a million square feet of floor space.

Removals and Trade Changes

The Quaker City Rubber Co., of Philadelphia, is soon to move into its new Quaker Bldg., at 624 Market St. The building will house the main offices and sales rooms.

The General Motors Corp. has decided to transfer the executive heads of the company from New York to Detroit to gain closer coordination between the control offices and the factory. The corporation now includes 78 subsidiary and affiliated companies.

Commercial Cars, Ltd., Toronto, Canada, distributor of Commer cars and Stewart trucks, announces that offices, show rooms and service station are now under one roof at 115, 117 and 119 Dupont St.

The Madison Tire & Rubber Co., Inc., has moved its general offices from 20 West 60th St., New York City, to its factories at Buffalo, N. Y. The move is made to expedite orders and effect further economies, the company announces.

The Chicago Belting Co. now has an up to date direct factory branch at 336 3rd St., Pittsburgh, Pa., from which it is doing a large amount of its total distribution.

The Goodyear Tire & Rubber Co., of New York, at a special meeting of the stockholders approved a plan recommended by the directors to dissolve the New York company.

New Agencies

The O. Armleder Co., Cincinnati, announces the following new agencies for its trucks: Allender Bros., Inc., 2601 Pennsylvania Ave., Baltimore; J. M. Hunt Truck and Tractor Co., Charleston, W. Va.; Camden Motor Sales Co., Clarksburg, W. Va. and the Union Motor Car Co., Paducah, Ky.

The Harrisburg Harness & Supply Co., of Harrisburg, Pa., has been announced as local dealer for the products of the India Tire & Rubber Co., of Akron, O.

The Spiltdorf Electric Co. has re-established itself in "auto row," New York, with a service station in the Paige Bldg., 1755 Broadway. Charles N. Neil is the new district manager in control of the branch.

The Federal Automotive Sales Co., of Detroit, is to distribute products of the Penberthy Injector Co. in the states of Ohio, Michigan, Illinois and Indiana. E. H. Janes is president of the company.

Earl P. Cooper Co. has been appointed distributor of the Perfecto two-speed axle products for Fords in northern California, maintaining centers at San Francisco, Oakland, Sacramento and Fresno. The products are made by the Ruskstell Sales & Manufacturing Co.

The Missouri Auto Signal Co., 1421 Locust St., St. Louis, Mo., has been awarded the distribution of Kobzy safety signals manufactured by the Chicago Die & Specialty Co., for St. Louis and the adjacent territory.

Obituary

E. W. Brooks, acting factory representative in the southwestern states for the Acme Motor Truck Co., Cadillac, Mich., died suddenly at Kansas City, September 19, as a result of apoplexy. Mr. Brooks has been prominently identified with several of the leading firms in the automotive industry and has always been a great asset to the Acme organization. He was an intelligent earnest worker and he possessed a pleasing personality which gained him a host of friends in the industry.

NEW COMMERCIAL CARS



Security Twin-Drive Truck

ACCORDING to the Freeman Motor Co., Omaha, Neb., a truck to successfully meet all conditions, must be built on the 4-wheel drive principle, where the power is delivered to all four wheels, giving greater ability to carry capacity loads, as well as trailers, over all kinds of roads.

In a new type of 4-wheel drive, front wheel steer truck, recently designed and built by this company, these requirements are said to have been met. It is known as the Security Twin Drive, a high-power, high-speed road express truck, of $2\frac{1}{2}$ tons capacity. Because of its wide range of gear ratios, eight speeds forward being provided, it is said that it can readily adapt itself to any manner of going.

One of the most important points of this design is the application of power to the front wheels, in order to obtain an easy steering vehicle and, at the same, a simple drive. This has been accomplished by employment of the bevel design, as may be seen from one of the accompanying illustrations. The maker also points out that no matter how great the angle to which the front wheels are turned to, the gears transmitting the power have absolutely fixed center distances. No strain or load is carried by steering mechanism.

The power is transmitted from the engine through a four-speed constant mesh type transmission, which is connected by a disk type universal joint to the transfer case, which is located in the center of the truck between the front and rear axle. The transfer case consists of an upper and lower shaft, upon which are mounted two pairs of silent chain wheels, the power being transmitted through 4-in. silent chains to the lower shafts. Through the shifting of a jaw clutch it is possible

to get 2 to 1 reduction on the engine speed, giving a final low gear reduction of 72 to 1, which is stated to be ample to carry a truck over an 80 per cent grade.

The 2-chain wheels on the lower shaft are fastened to an automatic type locking differential.

This center differential is the point where the power of the engine is divided and sent to each axle in its proper proportion; its action between the two axles being the same as that of the front and rear differential between the wheels. The locking type of differential is also used and is interchangeable in the front and rear axles.

Another feature of the Security truck is said to be its scientifically efficient braking system. Braking action is on the drive as well as on all four wheels. The service or foot brake is located on the main shaft of the transfer case, integral with the 2 to 1 reduction gear. It is com-

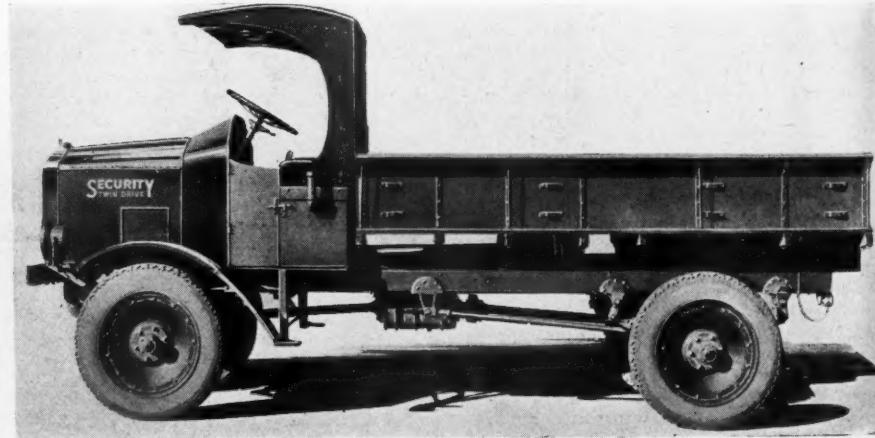
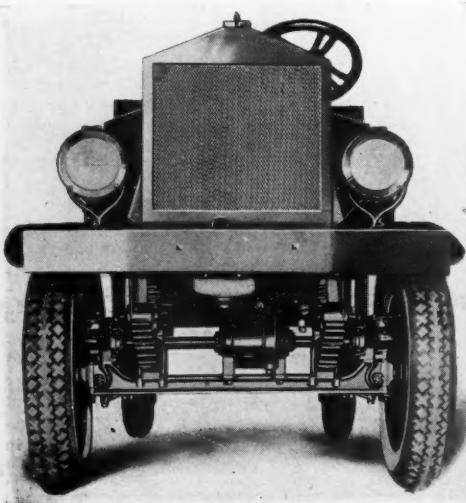
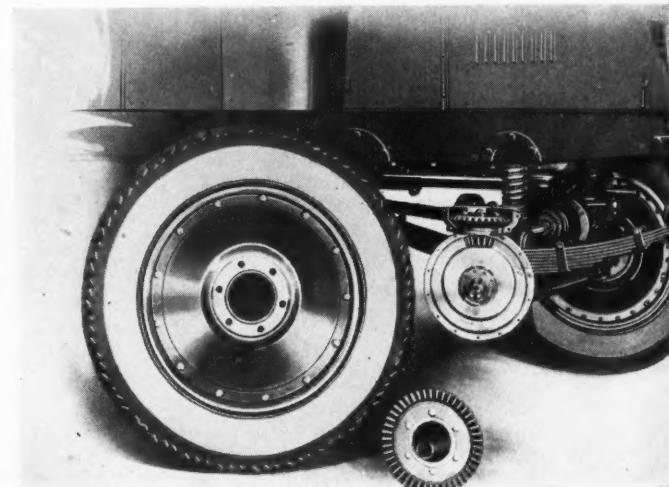
pletely inclosed and operates in oil. The emergency brake is located on the secondary shaft of the transfer case and is operated by hand lever.

The engine is a Model HTU Buda, a four-cylinder, vertical L head, detachable head type. It is suspended from three points and has a bore and stroke of $4\frac{1}{4}$ in. x $5\frac{1}{2}$ in., respectively. S. A. E. rating, 29 hp., and brake hp., 52. Speed is controlled by a Pierce governor.

Ignition is by a Bosch or Eisemann high-tension magneto. The carburetor is a Zenith, of the float feed type, $1\frac{1}{4}$ -in. opening. The air intake is connected with a stove on the exhaust. Dash air control. Gas is fed from a 30-gal. tank, located under the driver's seat, by a vacuum system to the vacuum tank on the dash and from there by gravity to the carburetor.

The lubrication system includes a pump, operated by spiral gears and capable of developing 39 lb. pressure at 1000 lb. pressure.

Views Showing Construction of the Security Twin-Drive Truck.
Its adaptability encompasses all manner of work. It is four-wheel-drive and front-wheel steer.



Cooling liquid is circulated by a gear-driven centrifugal pump. Capacity of the cooling system is 8 gal., which can be completely drained. Cooling is further aided by a 4-blade fan, 18 in. in diam., mounted on an adjustable bracket and driven by a flat belt 2 in. wide.

From the engine the power is transmitted through a Detlaff multiple-disk, dry-plate clutch to a constant-mesh Cotta transmission. This gearset provides four speeds forward and one reverse. The gear ratios are as follows: 1st, 5.2 to 1; 2nd, 3.684 to 1; 3rd, 1.857 to 1; 4th, 1 to 1, and reverse, 4.666 to 1. The transfer case is patented. Link Belt Silent Chain Drive, giving choice of two ratios, 1 to 1 or 2 to 1, from all speeds obtainable in transmission. The rear axle is internal gear drive. All rotating members are enclosed and operate in oil. Powerlock differential-axle ratio is 7 to 1. Hess-Bright

and S. K. F. bearings are used throughout.

Final gear ratios from engine to wheel are as follows: 7:1, 4th or high; 12.99:1, 3rd; 25.78:1, 2nd; 36.4:1, 1st, and 32.66:1, on reverse. By shifting the jaw clutch in transfer case to 2 to 1 reduction: 14:1, 4th; 25.99:1, 3rd; 51.75:1, 2nd; 72.8:1, 1st, and 65.33:1, on reverse.

The front axle is bevel gear drive. The load carrying member is a steel forging of I beam construction.

The drive shaft is of Norwalk seamless steel tubing, heat-treated and welded to drop-forged steel spiders, equipped with Goodrich driving disks.

The Parish & Bingham pressed steel channel section frame is 216 in. long, 34 in. wide, inswept to 31 in. between front wheels. It is supported by four semi-elliptic springs. The steering gear is a

Wohlrab No. 4, mounted on the left side of the chassis. Diameter of wheel is 22 in.

Disk type Disteel-pressed steel wheels are used. They are detachable and demountable and fit either front or rear axle. Tire equipment is Firestone pneumatic, 38 in. front and rear.

The Security Twin Drive is completely electrically equipped with Westinghouse starting motor and generator, Exide battery, two high-powered headlights, which have a special feature incorporated in them which allows these lights to be swung backwards, throwing a light to the rear of the truck when loading and unloading in the dark; also electric tail light and electric horn.

An air pump is fitted to the side of the transmission case for the inflation of the tires, with hose and air gage to reach all four wheels.

Wisconsin Six-Cylinder Speed Truck

DESCRIBED as a powerful, high-speed truck, the six-cylinder Wisconsin motor truck, manufactured by the Wisconsin Truck Co., Loganville, Wis., is claimed to contain the necessary mechanical prerequisites for adaptation to any kind of hauling of three tons or less.

It is pneumatic equipped, and the comparatively light weight and smooth running qualities are two of the features that figure largely in the claim of maximum tire mileage. The price complete with body, cab and other standard equipment, as hereinafter described, is \$2750, plus war tax.

The maker states that it is economical to operate and thoroughly reliable. The complete job is attractive in general design and finish.

The following is a brief resume of the principal features of construction, units, specifications and standard equipment:

Power is provided by a Continental six-cylinder engine, having a bore and stroke of 3 1/2 in. x 5 1/4 in., respectively. Ignition is furnished by a Bosch high tension mag-

neto. The starter and generator is also of Bosch manufacture.

From the engine the power is transmitted back through a Borg and Beck disk clutch to a selective sliding gear transmission, providing three speeds forward. A two-section, full-floating propeller shaft, equipped with ball and socket universals, carries the power to the rear axle. Final gear is through a Torbensen internal gear. The ratio is 7 to 1.

The front axle is of the conventional I-beam construction, equipped with roller bearings on the spindles. Four semi-elliptic springs support the channel steel, hot-riveted frame.

Pneumatic equipment consists of giant non-skid cords, 38 x 7-in. rear, and 36 x 6-in. front. Both head and tail lights are electric. The wheelbase is 146 in. The job complete is finished in brown with red wheels.

A combination box body or platform body, and full cab, with side curtains or with full height doors, are included as standard equipment. The weight is 4700 lb.

Imperial Line of Buses Are Announced

The Trackless Transportation Corp., 300 Madison Ave., New York City, are offering to the trade a new type of omnibus said to have been evolved after extensive investigation. This new bus is known as the Imperial, and will be built, all of the same character of construction, in 20 and 30 passenger, single-deck and 49 passenger, double-deck models. The important factors claimed to have been met in a completely definite manner are: Low cost of maintenance, maximum of safety and comfort to the passengers, and general economy of operation.

The units employed in the construction of this job are of special design and in every case selected after careful study. The engine is Buda make and the transmission is of the four-speed type mounted amidships. Chassis equipment includes: Complete electric starting and lighting system, speedometer, power tire pump, Moto-Meter and complete tool equipment.

The body is of steel construction throughout and is of the truss side type. Entrance is forward right. The folding door drops sufficiently to provide easy entrance with two short steps.

The interior is finished in birch, stained mahogany color. The roof is of Haskelite finished in white enamel. Illumination is provided by seven dome lights and one step light. The interior is also well equipped with pedestals, seats, end brackets and grab handles of Lynite. Push buttons are provided at each seat.

Another feature in design is three exhaust ventilators arranged along the center line of the roof, covered with aluminum grills.

Duty Truck Plant Begun

Ground will soon be broken for the new plant of the Duty Motor Corp., at Elgin, Ill., which recently decided to remove from Greenville, Ill., and which manufactures motor trucks. M. L. Frank is sales manager. Residents of Elgin have subscribed for a large block of stock.



Wisconsin Six-Cylinder Truck. It is Rated at Three Tons and is Especially Suited for Dispatch Work

"Speedboy" New One and a Half Ton Traffic Job

IN announcing the new Traffic 1½-ton "Speedboy" the Traffic Motor Truck Corp., St. Louis, has endeavored to meet the present-day need of merchants and manufacturers with a light, speedy, economical delivery vehicle that combines unusual qualities of sturdiness and convenience with remarkable attractive appearance. Special attention is given in the design to secure a large loading space with short turning radius and low-hung chassis. It is listed at \$1650.

The equipment includes pneumatic cord tires on heavy disk airplane type wood wheels and electric lights and starter. The top is full length, 5 ft. from the floor, with roll-up curtains at side and rear end; driver's cab is roomy and comfortable, also with side drop curtains. Load area measures 8 ft. inside from rear of seat by 44 in. wide.

The quality of the "Speedboy" is best indicated by the standard units combined in its design, such as: Continental motor, Bosch magneto, Covert transmission, Gray & Davis starting and lighting system, Carter carburetor, Russel internal gear rear axle, Timken roller bearings, Detroit steel springs, Fisk tires.

Complete specifications in greater detail are as follows: Maximum capacity, 3000 lb.; chassis weight, 3400 lb., and road clearance, 12 in. The engine is a Continental 4-cylinder unit power plant, 3-point suspension, 3½ in. bore, 5 in. stroke, 3-bearing crankshaft; maximum engine speed, 2000 r.p.m.

Lubricating system is combination force feed and constant level splash; gear driven pump supplies oil to timing gears and main bearings; other parts lubricated by oil splash.

Carter carburetor is special automatic with gravity feed; gasoline tank, capacity 12 gal., is made of pressed steel and located on dash.

Ignition is Bosch magneto, cooling is thermo-syphon aided by a 15-in. fan. The radiator is of the cellular type mounted in

a 4-piece cast-iron shell, non-corrodible. The clutch is of the multiple disk type, enclosed and completely protected from dirt. Three speeds forward and one reverse is provided by a Covert gear-set.

The two-piece propeller shaft is equipped with 3 universal units, and alignment is maintained by a self-aligning roller bearing. Control consists of steering gear on left, 18-in. wheel, worm and gear type; gear shift and hand brake levers in center; foot accelerator for carburetor; hand spark and throttle control on steering column.

The rear axle is Russel Internal Gear. Internal expanding and external contracting brakes insure positive braking action.

A conventional I-beam, drop forging with Timken roller bearings at wheels, makes up the front axle. Heavy truck type Detroit steel springs are used. The frame is of exceptional strength, being

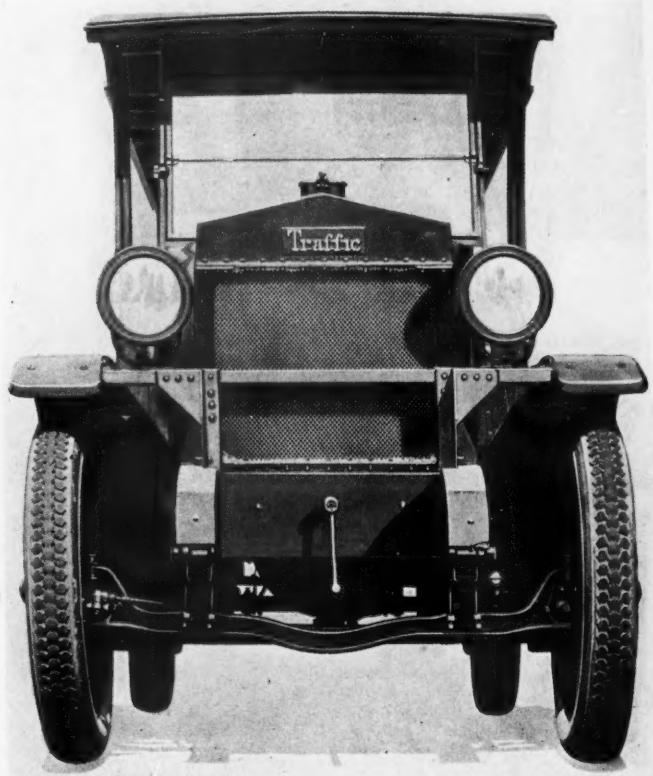
made of 6-in. U-channel structural steel, 177½ in. long over all, with ends heavily bound and gusseted.

Demountable rims. The wheelbase is 128 in., with length of frame back of driver's seat, 86½ in.

Pneumatic cord tire equipment is Fisk, 35 x 5 front and 35 x 5 rear; starting and lighting system, Gray & Davis; starter, Bendix drive; generator, Gray & Davis; head lamps complete with single contact dimmer and head bulbs and non-glare lenses; tail lamp.

Equipment includes pneumatic cord tires, starting and lighting equipment described above, explosion whistle, full set of 16 gage roll fenders, running board skirts, front splash, running boards, speedometer, 2-way ventilating metal windshield, seat and cowl, canopy top body; full set of tools; chassis and body complete painted, striped and varnished.

Front View of the New Traffic "Speedboy." It is Pneumatic Cord Tired Disk Wheel and Electrically Equipped. It is Listed at \$1650



Special Attention Has Been Given in the Design to Secure a Large Loading Space, With Short Turning Radius and Low-Hung Chassis



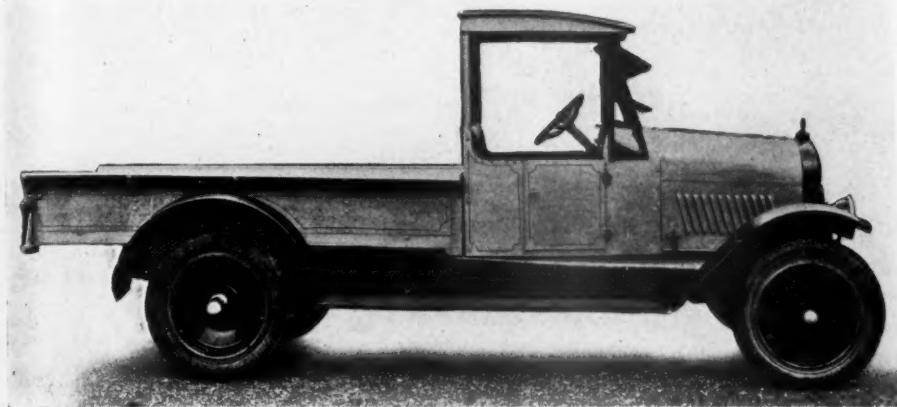
Body specifications are as follows:

Panels, ½ in. gum, 15½ in. high, reinforced with oak rail at top; flares ½ in. clear oak, 6 in. wide, 45 deg. angle; tail gate dropped with chain; top, 4-post stationary extending full length of body and over dash; roof covering No. 10 sailduck painted, roll-up curtains of black oil duck on each side and rear end; posts of close grain white ash; height of top 5 ft. from floor to underside of top; cushion of imitation leather with deep cushion springs and lazy-back full upholstered with springs. All ironing hand forged and bolted with through bolts. Driver's cab equipped with drop curtains, and well reinforced throughout.

Larrabee Announces New One-Ton Six

A NEW six-cylinder speed truck described as being armed with power, sturdiness and quick get-away was recently put on the market by the Larrabee-Deyo Motor Truck Co., Inc., Binghamton, N. Y. Full freight capacity with passenger car flexibility are

the Larrabee-Deyo line now consists of five models, namely, 1-, 1½-, 2½-, 3½- and 5-ton units. The Larrabee Company is a name of long standing, an outgrowth of the wagon and sleigh constructing days. It was organized thirty-five years ago and its activities up until seven years ago was



Note the Attractive Lines Preserved in This New Six-Cylinder, One-Ton Larrabee Speed Job

the points featured. Its flexibility enables ease of negotiation through the heavy congestion of city traffic by reason of its low throttling ability and quick get-away. It is claimed that it can pick up a speed of 25 m.p.h. within 40 ft.

With the addition of this new model

devoted exclusively to the manufacture of horse-drawn vehicles. The prestige and reputation acquired in this business by the company is well known amid wagon business circles. When the change of times, brought about by the advancement of the automotive industry, pointed out the uni-

versal need for motor propelled units, the company entered this new field with the one purpose of offering its new product on the same basis that gained for it the popularity of its earlier-day products, namely, quality, value and service.

This new job with its inswept frame presents a neat and well lined appearance. Comfort for the driver received consideration in the designing of the cab, it containing well upholstered seat and back, top and two-piece windshield.

The 138-in. wheelbase provides an evenly distributed loading space of 9 ft., measured from the rear of the driver's seat. As may be seen from the illustration, it is Disk steel wheel equipped and mounted on 34 x 5 truck cord tires.

The following consists of major specifications:

Continental model 7R engine having a bore and stroke of 3½ in. x 4½ in. Brown-Lipe clutch and transmission, Gemmer steering gear. Inside control. Special heavy, spiral, bevel-gear rear axle and Brown-Lipe-Chapin differential. Gear ratio, 5¾:1. Engine ungoverned and will develop 45 hp. at 2500-3000 r.p.m. American Bosch ignition and starting equipment. Exide batteries. Zenith carburetor. Springs: rear, 54 in.; front, 38 in.

Price, complete with windshield, seat, cushions, electric lights and starter, \$1925; with express body, cab, curtains, windshield, electric lights and starter, \$1990; with express body, canopy top, curtains, windshield, electric lights and starter, \$2050; with cab, curtains, windshield, standard stake body, electric lights and starter, \$2050.

Specially Equipped Denby for City Work

THE motor truck of today is a major factor in the expeditious removal of a big city's garbage. Speed and ease of handling are especially necessary during the hot summer months. The Denby Motor Truck Co., Detroit, Mich., recently furnished the City of Detroit a model 27, 4-ton Denby, equipped with specially designed body and hoist.

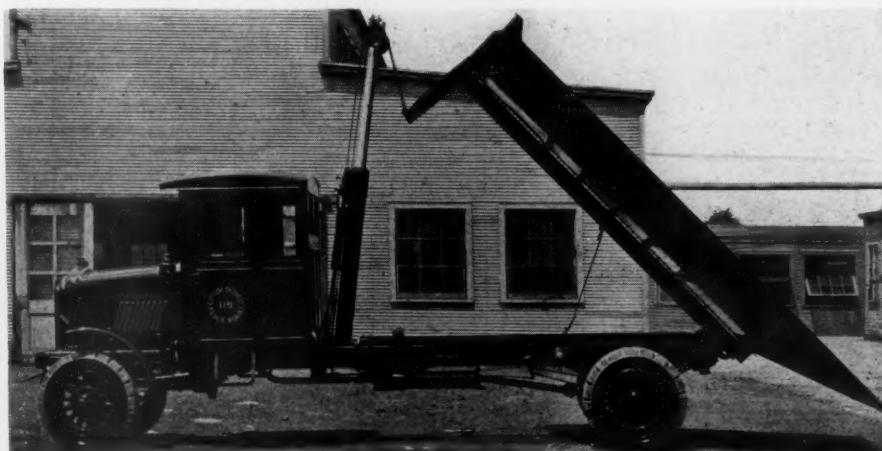
One of the most important facts considered was that the body should be dumped, thereby insuring better sanitation. In order to properly do this, a special Woods hoist providing a 51 deg. elevating angle was used. In order to allow quick return of the body after dumping, an extra expansion chamber was incorporated in the hoist. The hoisting apparatus is connected directly with the transmission through a power take-off and control of the entire mechanism is obtained from the driver's seat.

Body construction is such as to prevent leakage. When covered, the body exhibits nothing of its load. One solid sheet of boiler steel is used for the front end, bottom and lip of the body. No joint is

present at any point, thereby insuring extreme ease in dumping the load. All rivets are countersunk and brazed and in order to prevent leakage all joints were welded. The body is 16 ft. long and handles 7800 lb. every load, working sixteen hours daily with two shifts of men.

Enough slack is allowed in retaining cable so that when the hoist performs its full duty the cable catches the body up sharply, snapping out all of the remaining refuse.

It is Sewell cushion wheel equipped with Kelly caterpillar tires. Comfort and protection for driver and helpers is secured by the installation of a special three men enclosed cab of the all weather type. Electric lights, front and rear and generator and battery equipment are added features. Drawbar attachment is provided.



Specially Equipped Denby to Expedite Garbage Removal

Eugol Speed Truck Offered by New Company

EUGENE GOLDMAN, the organizer and former vice-president and general manager of Master Trucks, Inc., has organized a new motor truck company, the Eugol Motor Truck Co., with headquarters at 116 S. Michigan Ave., Chicago, and factory at Kenosha, Wis., through which he will market the Eugol speed truck.

The design of the Eugol speed truck is stated to be the result of vast experience in the transportation field. It is a quality product, containing only the best known and proven standard units in its construction. An open cab, with cushion, lazy back, side curtains and glass windshield are standard equipment.

The company will also specialize in various standard bodies, such as express, with or without canopy top, platform stake, grain, stock, passenger carryall, school, jitney and hotel buses.

Present factory capacity is 20 trucks per day. An additional building 385 ft. long is now under construction, which will be used exclusively for body storage and painting.

The following is a brief outline of specifications:

Engine—Buda M U "Buddie," 3 1/8 x 5 1/8 in., four-cylinder, removable cylinder head, all working parts enclosed, three-point suspension, rear motor supports mounted flexibly on cushion springs and crankshaft carried on three extra large bearings.

Lubrication—Full force self-contained positive pressure feed.

Cooling System—Water circulated by centrifugal pump, liberal water passages.

Radiator—Mounted on coil springs to relieve vibration and road shocks. Tubular core, with cast tanks and sides—upper tank of polished aluminum.

Carburetor—Air adjustment on dash. No governor.

Electrical Equipment—Westinghouse starting and lighting system. Battery under seat. Two electric headlights with dimmers and non-glare lenses. Tail light and horn.

Clutch—Multiple-disk dry-plate faced with Raybestos.

Transmission—Three speeds forward and reverse. Gears and shafts of nickel steel. Unit power plant.

Propeller Shafts—Tubular shafts equipped with three dustproof, oiltight Universal joints, center joint mounted on S. K. F. self-aligning bearing, eliminating all whipping action.

Frame—Pressed steel, with all spring hangers and cross-members hot riveted. 6-in section, 2 1/2-in. flange, 7-32-in. stock. Five cross-members reinforced by gusset plates. 8 ft. 6 in. back of driver's seat.

Springs—Mather semi-elliptic front and rear, heat-treated and oil-tempered chrome vanadium steel. 38 x 2 1/2 in. front and 48 x 2 1/2 in. rear. All spring eyes bronze bushed.

Front Axle—Timken drop-forged I-beam with Timken roller.

Rear Axle—Timken latest type worm drive with F & J tooth. Timken roller bearings.

Steering Gear—Ross semi-irreversible. Worm and solid nut type.

Wheels—Artillery type, with air dried second growth hickory square spokes.

Wheelbase—135 in. (Wheelbase for contractor's special mounted with dump body, 110 in.)

Tread—56 in.

Tires—Front and rear, 35 x 5-in. pneumatic cord construction, heavy truck type. Tire pump mounted on transmission.

Gasoline Tank—Located under seat, extra heavy, leakproof, 14-gal. capacity, vacuum feed.

Chassis Lubrication—Alemite.

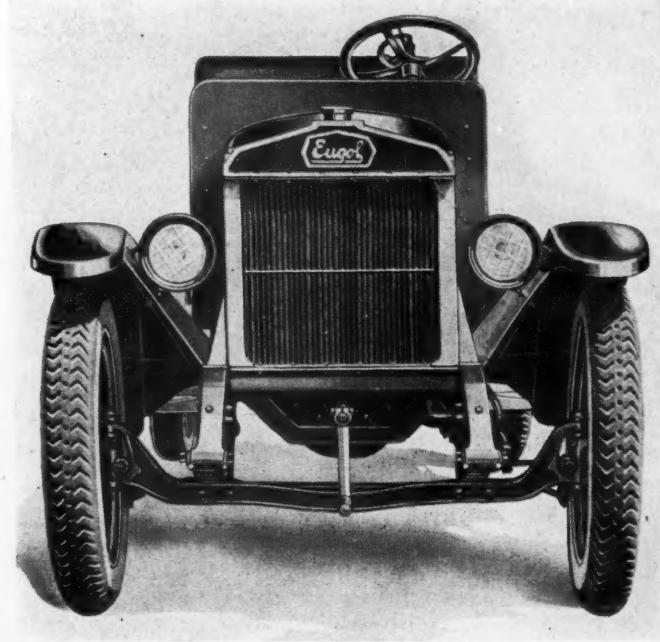
Color—Eugol bright red.

Additional Equipment—Speedometer, jack, complete set of tools.

Capacity—2000 lb.

Price—\$1895 f.o.b. factory.

Front View of the New Eugol One-Ton Job. Standard Units Are Used in Its Assembly. It is Listed at \$1895.



An Open Cab, With Cushions, Lazy Back, Side Curtains and Glass Windshield Are Standard Equipment.



Bill to Limit Truck Length

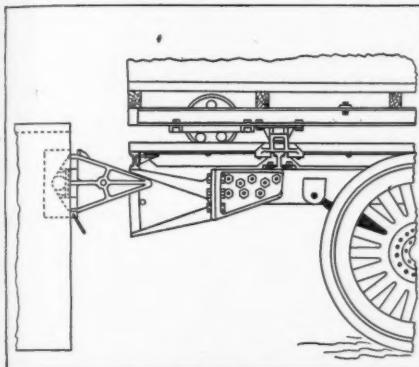
Trucks will be limited to thirty feet in length, according to an ordinance introduced before the Commission Council of New Orleans. Their speed limit is fixed at fifteen to twenty miles an hour in the daytime, according to size, and ten miles at night. Heavy trucks are also barred from the principal part of the commercial district.

Correction

In the description of the Scintilla Magneto which appeared in the September issue of the Commercial Car Journal, the captions of the illustrations on the top of page 37 were inadvertently transposed. By transposing the captions as they now appear a correct version of the illustrations may be had.

Roloff Bodies Reduce Delivery Time and Cost

SPEED is one of the considerations of prime importance in motor truck transportation today. There is a pronounced need for more efficient and more economical transportation especially in city and inter-urban deliveries. Wide awake business men are constantly on the alert to cash-in on time and labor saving equipment to meet the demand for increased operating efficiency so urgent during the present economic readjustment through which we are passing.



A Loaded Body

Showing the wedges raising chassis to proper level; also how they ease the load to the springs on leaving

It is generally conceded that loading and unloading is the big and important factor in practically all trucking work. Also, that the average time consumed by each truck depends largely upon the nature of the business. Hence, if a saving of time and human energy can be exacted by the utilization of demountable body equipment, adaptable to the various hauling requirements of concerns, good business demands its use.

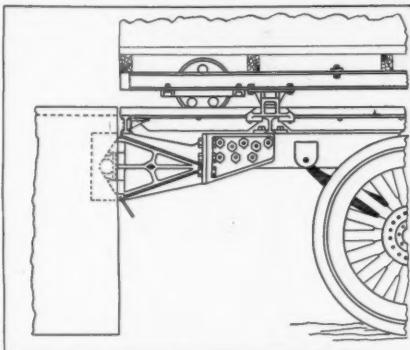
The Perin Automotive Engineering Co., Inc., transportation efficiency engineers, 846 Commonwealth Ave., Boston 47, Mass., in offering its Roloff Demountable Body Equipment is realizing a simple and practical equipment that will enable the truck owner to keep his trucks on the road, to utilize every moment of the driver's time and eliminate all waste energy.

With this equip-

ment merchandise can be stored in the body ready to go and not on the shipping floor ready to load. Besides yard congestion is avoided, by reason of the short time required to load a truck and send it on its destination, thus

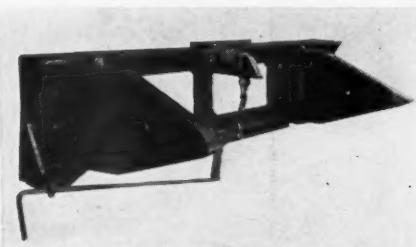
making room for other waiting trucks.

The possibilities of reducing the time factor in loading at the platform can readily be conceived. When the truck arrives at the loading platform it backs against a leveling device, which brings the tracks of the chassis to the level of the tracks on the platform (note the accompanying illustration). The body of the truck is held securely to the chassis in four places. By pushing down the levers of two forward locks the body is released and may then



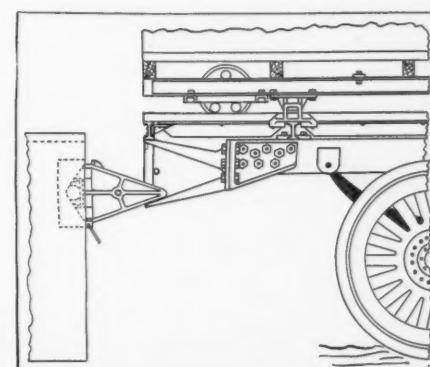
Wedge and V-Blocks Engaged

When fully engaged the chassis is locked and springs neutralized while the body is shifted



Wedge Block Assembly

Note the automatic latch which locks the chassis to the platform while body is being moved



An Empty Body

Showing how the wedges pull the tracks on the chassis down to level of those on platform

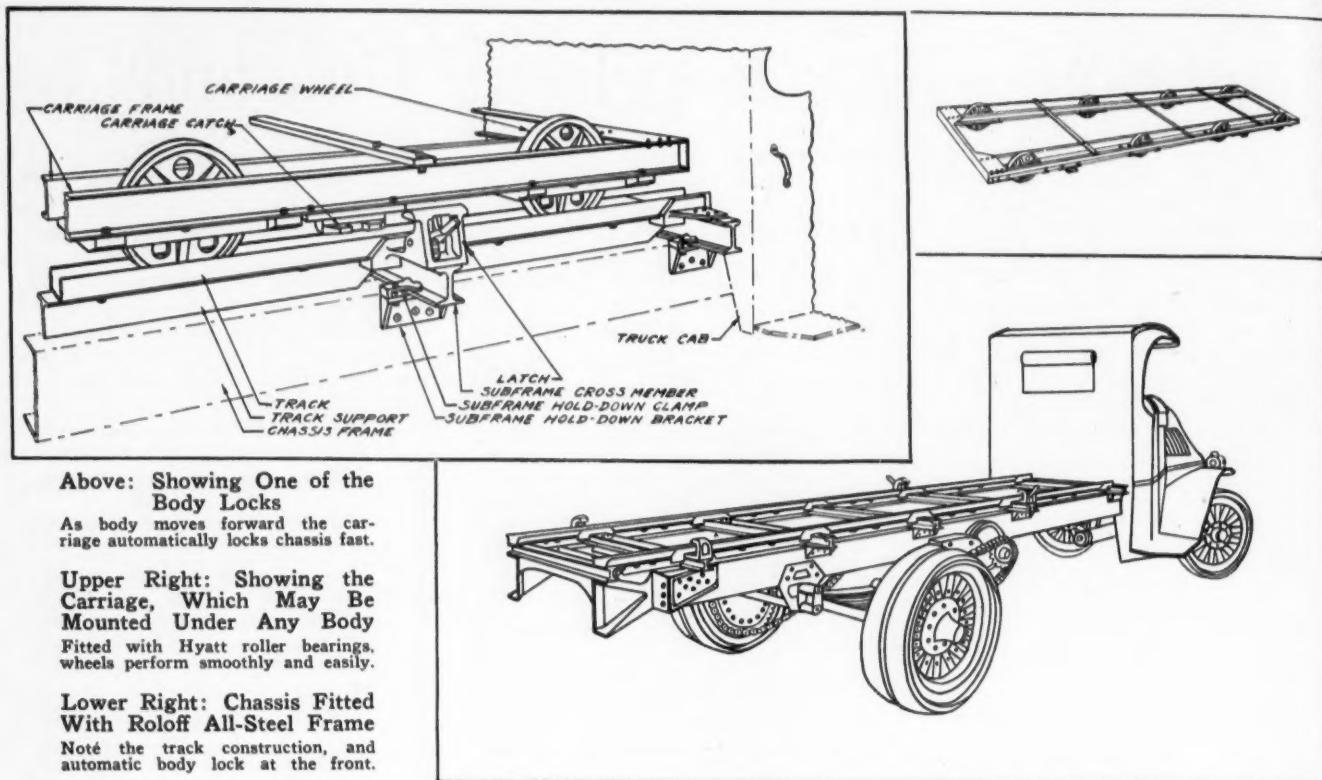
be rolled off onto the platform by hand.

When the body is removed, the lock which holds the chassis to the platform is released and the truck changes to a position in front of another loaded body. Here it is again leveled and locked by another leveling device, and the loaded body is rolled from the platform to the chassis by hand. The body is automatically locked in place by the two body locks and two catches, so that it cannot come off. The truck is then ready to deliver its load.

All this is accomplished within six to ten minutes from the time the truck arrives at the loading platform. All that is required of the loaders is the steady checking and stowing of merchandise in the empty bodies, which are dispatched immediately upon the return of the chassis. The employment of this system prevents



Exchanging an Empty Body for Loaded One. Average Time Consumed in Exchange, Eight Minutes



Above: Showing One of the Body Locks

As body moves forward the carriage automatically locks chassis fast.

Upper Right: Showing the Carriage, Which May Be Mounted Under Any Body Fitted with Hyatt roller bearings. wheels perform smoothly and easily.

Lower Right: Chassis Fitted With Roloff All-Steel Frame Note the track construction, and automatic body lock at the front.

confusion, eliminates the hustle and bustle of getting the truck loaded and out as under the old plan, does away with extra men, idle time, power to operate, and yet there are many hours added every day to the delivery time of every truck.

Roloff equipment is well constructed of steel and iron, and is capable of withstanding severe service. The chassis is fitted with a special all-steel frame and the design of the Roloff carriage is such as to

permit it to be mounted under any make or style body. Whether loaded or not the body movement is smooth and easy, responding quickly to but very slight manual effort. This is due to the Hyatt bearing equipped wheels with which the carriage is fitted.

A novel and most practical constructional feature is the wedge block assembly, which brings the tracks on the chassis exactly level with, and in front of, the

tracks on the loading platform. As may be observed from the illustration, a strong latch, automatic in action, is provided on the upper side of the cross member and centered between the two wedges. It is the latch which locks the chassis to the platform while the body is being moved. It is easily pulled out of engagement for releasing by pulling a lever at the left of the chassis.

The Automatic Electric, a New Development in Electric Motor Cars

An efficient, economical car that is claimed to do anything that a larger car will accomplish within a radius of 50 to 60 miles, at a speed of 15 to 18 miles per hour, was recently put on the market by the Automatic Transportation Co., Buffalo, N. Y. It is known as the "Automatic Electric," and is also manufactured in commercial and industrial shop car models, all having the same general chassis and mechanical features.

Aside from its economy of operation, this job has many distinct advantages. Because of its size it can be parked in a space 4 x 8 ft.; it is ideal for use in congested traffic. It is comfortably upholstered in leather, having a deep soft seat and back rest. The placement of the steering and control levers is such that the driver may enjoy restful support at all times.

The commercial model is unique and ideally suited for the high-class merchant and retailer. It possesses advertising value because of its size and impressive appearance. It not only meets his haulage requirements, but insures clean, reliable deliveries at a small operating and maintenance cost.

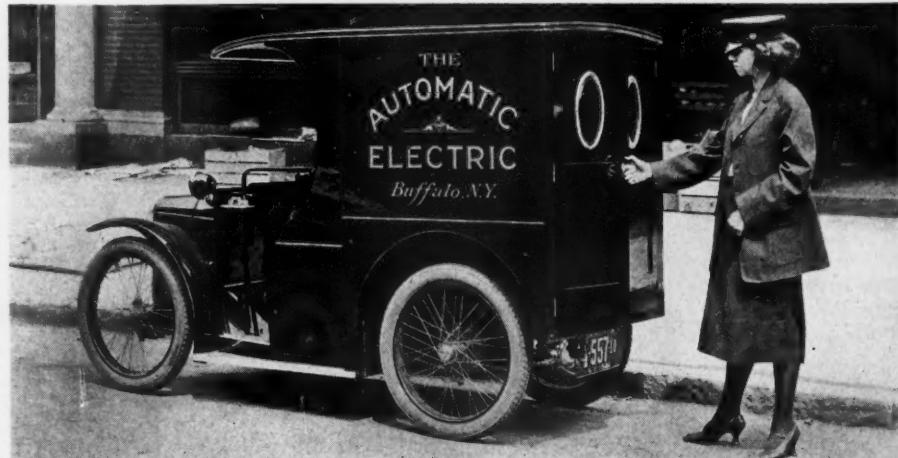
This car has a cruising radius of 50 miles on one charge of electricity at a speed of 15 m.p.h., and a load capacity of 500 lb. There is but one easy step from the seat to the curb.

The shop car model provides quick, convenient, intershop transportation.

It also has many other uses in plants, such as carrying men and materials, distributing mail, assisting paymasters, time-keepers, watchmen and others in the performance of their duties.

The size and flexibility of this car allows the driver to go anywhere about the plant. For, with its narrow tread of 35 in. and its short wheelbase of 65 in., the average factory aisles and doorways offer no barrier to its progress.

The entire expense of operating lies practically in the cost of recharging the batteries, which is but a few cents per day. A complete charging apparatus is furnished with each car without extra cost.



Novel Delivery Car for Urban Deliveries

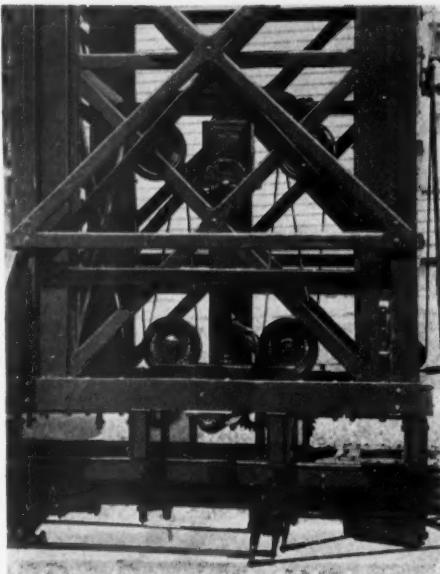
Standard Two and a Half Ton Hydraulic Elevated Trolley Tower-Truck

THE accompanying illustrations of the Standard trolley tower truck show an unusual installation of the tower and body arrangement. The tower can be elevated or lowered in less than a minute by moving a lever which is within reach of the driver's seat.

A three-section Trenton tower is located between the cab and body. The tower is operated by a Wood Hydraulic Hoist, located on two cross-members in the center of the tower. The hydraulic hoist is hooked up with the hand hoist arrangement, so that in case of emergency or when the motor is not running the tower can be raised easily by one man turning a crank. The tower lowers by gravity and the hand arrangement is fitted with a brake to control the downward speed of the tower.

The enclosed cab has sliding doors and is fitted with an auxiliary roof to allow the workmen to walk on it. A ladder shaped to the contour of the cab side is attached to provide means of getting on the tower platform.

The body is equipped with four longitudinal tool boxes. Two inside tool boxes are full length of the body and the two outside ones, which are longer, straddle the tower frame. Six double 8-in. hooks are attached to the body posts for hanging on coils of rope and wire, etc.



Close-up of the Tower Mechanism, It is Operated by a Special Wood Hydraulic Hoist

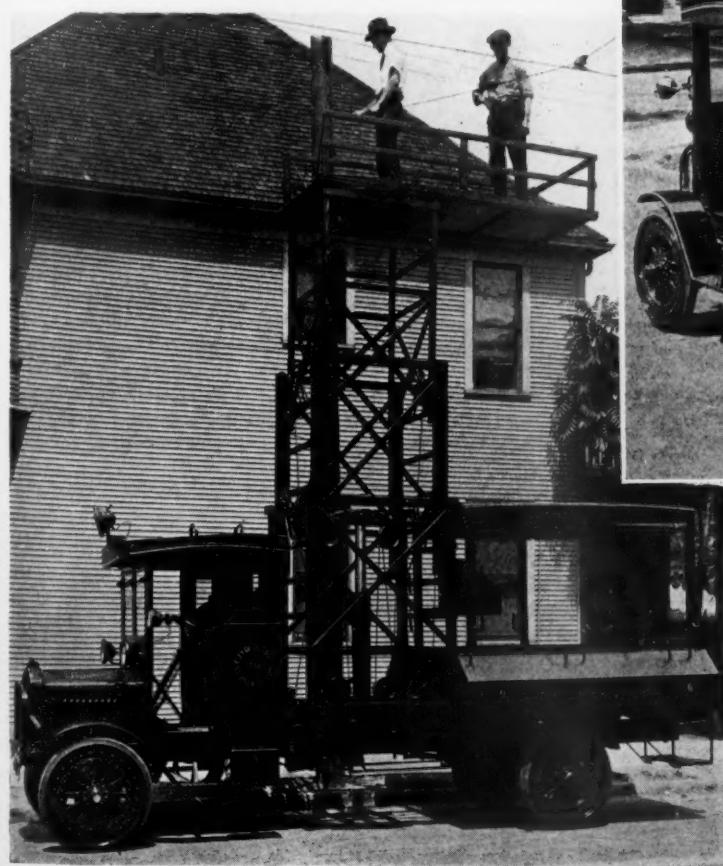
Primarily inside tool boxes, they also serve as seats for the workmen. The passageway between them has provisions for removable partitions to make four extra large compartments. Covers of outside tool boxes are on an angle, so arranged as to keep contents dry in wet weather.

A step and hand rail at the rear end of the body make it easy for workmen to get tools and material from the inside tool boxes and compartments.

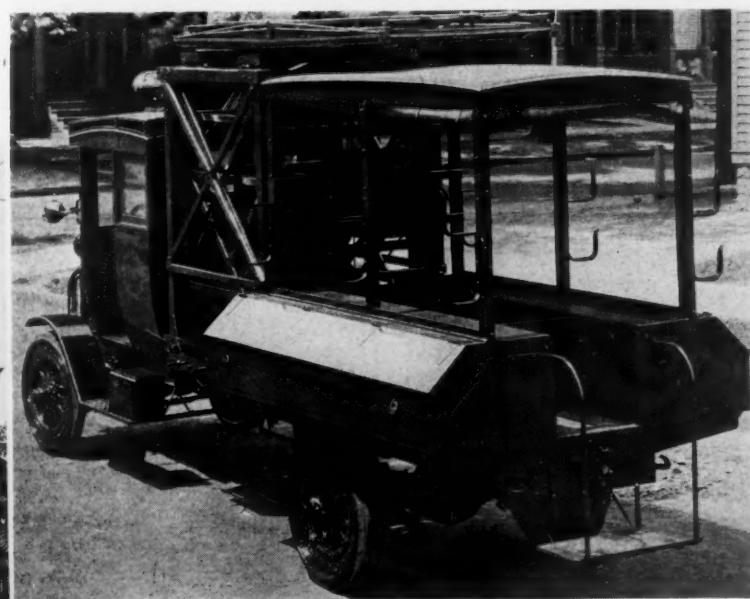
The body can be completely enclosed in inclement weather with curtains that are rolled up and attached to the top of the body. The chassis is equipped with a pintle hook and both front and rear tow hooks.

Electric lighting equipment consists of two headlights, one tail light, two dash lights, one spotlight and searchlight. The searchlight is mounted on the top of the cab and is so arranged that it can be swung in any direction to illuminate the work while repairs are being made.

The total height from the ground to the tower platform when elevated is 19 ft. 6 in.; when lowered it is 10 ft. 4 in.



Standard Trolley Tower Extended to Maximum Height



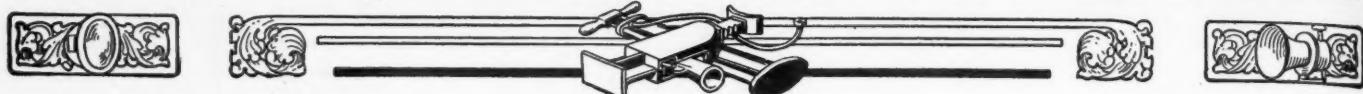
This truck is manufactured by the Standard Motor Truck Company, Detroit, Michigan.

Above: Standard Trolley Tower Truck Fully Equipped With Enclosed Cab and Completely Designed Tool Box.

Correction

In the September number of the Commercial Car Journal, page 76, a complete description of the Hough Mechanical Hoist, manufactured by the Hough Mechanical Hoist Co., Chicago, Ill., was published. An error in typography designated the elevating height of the hoist as 20 degrees. This, as the illustration showed, is obviously wrong. As a matter of fact, it will elevate a body to an angle of 70 degrees or higher if desired.

TRUCK EQUIPMENT AND APPLIANCES



National Worm Drive Axle for Speed Trucks

THE National Axle Co., Benton Harbor, Mich., in announcing its new type "100" worm drive axle for speed trucks of three-quarters to one ton capacity, states that the improved methods of manufacture employed and the large quantity production schedule makes practical the utilization of this axle in the assembly of a medium priced speed truck. It is stated that only the best of materials are used throughout the construction, and that this axle was designed and built by engineers of long automotive standing after much study.

Low cost of upkeep, long life and satisfactory every day service are some of the most important features claimed for this worm drive axle.

The following brief of the materials and construction will give a limpid insight as to the exact nature of the various units and their assembly:

The drop forged special alloy steel driving shafts are accurately ground, making for uniform stress throughout. The housing is a one piece casting thoroughly reinforced. These castings are machine molded and have a uniform thickness at all points.

Tested on a special machine by which the center distances can be accurately measured, the worms and wheels are all interchangeable with each other. The worm is alloy steel and the wheel special alloy steel bronze. Differentials of the 4-pinion type with drop forged gears and spiders, are standard in National axles of all capacities. The gears are of special alloy steel with heavy stub teeth. All bearing surfaces are hardened and ground and provided with oil grooves.

The worm and wheel together with

differential are mounted as a unit on a one-piece casting which forms the cover for the case. This assembly facilitates repairs, greater accessibility being afforded upon the removal of a complete unit. Timken roller bearings are used throughout.

Two pairs of internal expanded brakes provide an unusually large amount of braking surface. All openings are equipped with special felt washers to prevent oil and grease from creeping out of housing. Provision has also been made to prevent any dirt from working into the bearings.

Special attention is called to the lubrication of the worm and wheel. An oil

groove cast on the side of the worm mounting casting carries oil direct in a continuous stream to both worm shaft bearings. An old oil and sediment plug is provided in the bottom of the housing. An intermediate, "danger oil level plug," is also provided. This plug is located a little below the oil firing opening. Oil should not be permitted to sink below this point. The top plug is the filling point.

Ratios: 5 to 1, 6 1-10 to 1, 7 1/4 to 1, and 8 2-3 to 1. Centers: 6 in. Tread: 56 in. Spring centers: 34 in. min. and 40 in. max. for 3-in. springs. Spring clip hole, front and back: 4 1/4 in. Worm shaft end: 1 1/8 in. S. A. E. standard taper.

Simpson Flexeco 30, a Vaporizer

THE Pyrene Manufacturing Co., 17 E. 49th St., New York City, makers of Pyrene Extinguishers, has completed a series of experiments with a gasoline saving device for the Holley carburetor used in the Ford.

It is named the Simpson Flexeco "30." The object of the device is to break the gas up into the finest possible vapor, and thus improve the operation of the engine.

This device automatically regulates the gas mixture, so that maximum efficiency and gasoline saving is being obtained at all times. An increase in mileage of from 30 per cent to 50 per cent is claimed to be obtained; in fact, the company gives an unqualified guarantee of 30 per cent or more.

When all these features were proved to the satisfaction of the Pyrene Co., it sent

the device to various technical colleges for tests by disinterested authorities.

The Polytechnic Institute, Department of Mechanical Engineering, concluded a

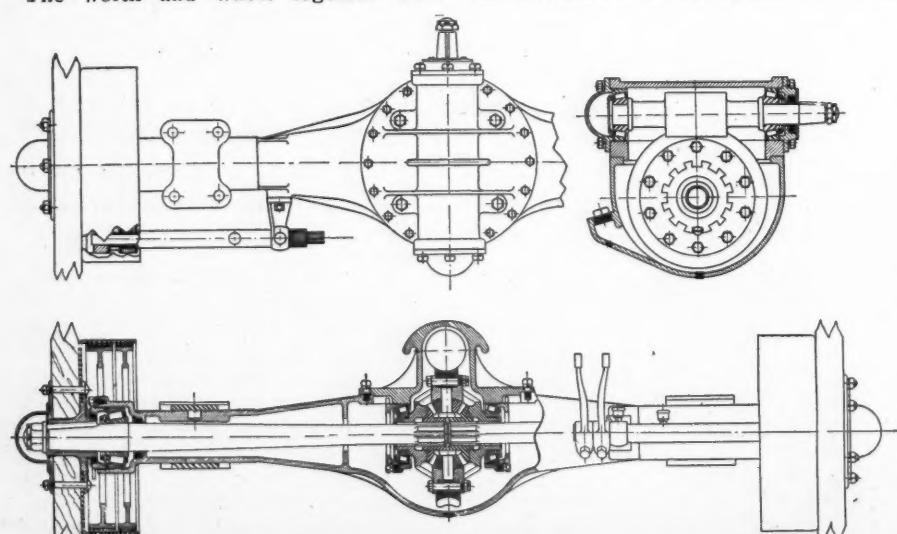


Showing the Two Main Units of the Simpson Vaporizer

series of Ford road tests with a Holley carburetor equipped with and without the new device. The comparative figures show an average increase of 30.8 per cent in mileage and such other improvements as greater smoothness, better acceleration and ability to idle at as slow a speed as four miles an hour.

This device consists of a brass cone-shaped device and a spiral spring. At 20 m.p.h. the position of the attachment in the carburetor is such as to permit some vapor to pass up through the chamber inside the cone, and more vapor to whirl up around the outside of the cone. The vapor passing through inside of cone is thoroughly broken up by slot-shaped ports. The vapor passing up on outside of cone is broken up by whirling motion and by the striking deflecting flange at top of cone.

At speed greater than 20 m.p.h., the cone lifts still higher on the needle valve



Plan and Sectional View of the New Type 100 National Worm Drive Axle for Speed Trucks

stem, due to increased suction from the motor, and allows an additional amount of vapor to pass up around outside of the cone.

At slow speed, the spiral spring holds cone down so that the flange at top of cone rests on the shoulder of carburetor chamber, thus closing the opening around

cone and forcing vapor to pass through inside of cone. Suction is the sole agent that actuates the automatic regulatory movement of the cone.

Russel Adds New Models to Its Line

THE Russel Motor Axle Co., Detroit, Mich., which is one of the divisions of the McCord Manufacturing Co., Inc., well-known radiator manufacturers, has, during the depression of the past year, been working on new designs of internal gear axles. The development work is completed, and its new models are now in production. All of these models possess the same characteristics and have many improvements.

The new models will be made for the following size trucks: 1-ton, 1½-ton, 2-ton and 2½-ton. With the exception of the 1½-ton, they replace the former P, S and U axles. The 1½-ton model is, however, an entirely new model and is intended to take care of the demand that many truck builders have felt recently.

For special speed truck equipment the 1½-ton axle is supplied with 16½-in. brake drum with a gear ratio of 6.33:1, while on the model 3000 axle a 15½-in. brake drum with a gear ratio of 6.5:1 is supplied.

The accompanying mechanical illustration, with the exception of the dimensions, applies to all models. The improvements possessed by these axles may be briefly summarized thus:

Spiral bevel driving gears are used on all models. This construction is claimed to give a greater degree of quietness than obtainable in straight teeth construction.

On models 3000, 4500 and 6000, the pinion shaft is machined with 10 splines for the universal joint flange. The model 8500 axle has a taper for the flange. On all models an improved 4-pinion type of differential is used. Hardened and ground thrust washers are used.

The jackshaft pinions are mounted upon the jackshaft in such a manner as to permit removal without disturbing the jackshaft. An enclosure for the jackshaft pin-

ion bearing is provided. An enclosure for the internal gear and jackshaft pinion is fitted to protect these parts from dirt, and also retain the lubricant.

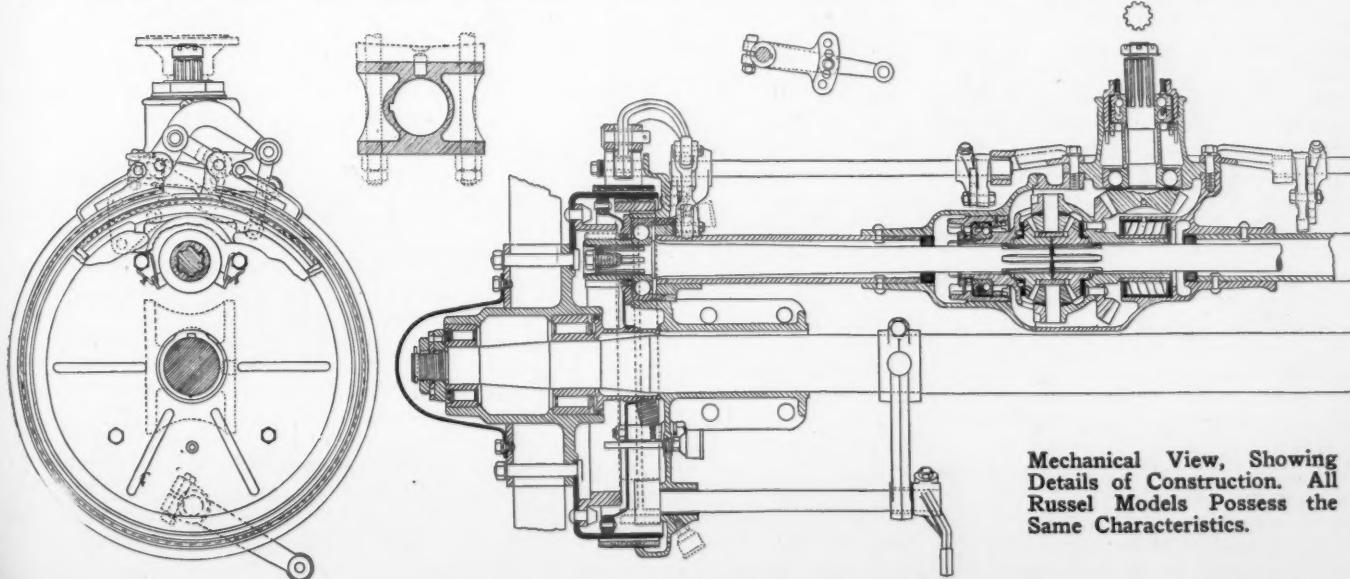
The operating mechanism for the external brake is improved, and an adjustment for the brake lever is provided. Provision for adjusting the wheel bearings is also fitted. This is in accordance with the recently adopted S. A. E. recommendations.

In addition to the new designs, a great deal has been accomplished in obtaining

greater production with improved workmanship. It is reported that the company's treating facilities have been more than doubled; special equipment has been installed; machinery has been rearranged to reduce excessive handling. The reduction of operating costs incident to these changes is said to have been sufficient to permit the company to sell the improved axle at a price no higher than was necessary for the former models.

The complete specifications of these axles are given below:

	3000	4500	6000	8500
Nominal capacity in tons	1	1½	2	2½
Weight, less wheels	450 lbs.	575 lbs.	656 lbs.	735 lbs.
Maximum weight on spring pads..	4500 lbs.	6500 lbs.	8000 lbs.	11000 lbs.
Maximum torque input in inch for different gear ratios	7:1-5000	7.45:1-8250	7.4:1-8250	9.3:1-10000
Internal gear and pinion	6 Pitch 1½ Face	5 Pitch 1½ Face	5 Pitch 1½ Face	4½-6 Pitch 1½ Face
Bevel drive gear	4-5 Pitch ¾ Face	4½ Pitch 1 Face	3½ Pitch 1½ Face	3½ Pitch 1½ Face
Differential	4 Pinion	4 Pinion	4 Pinion	4 Pinion
Dead axle				
Outer spindle diameter	1½	1½	1 49-64	2
Inner spindle diameter	2	2½	2½	2½
Spring seat diameter	2½	2½	2½	3
Bevel pinion shaft				
Diameter	1½	1½	1½	1½
Universal joint fitting	1½-10 Spl.	1½-10 Spl.	1½-10 Spl.	1½ Taper
Hubs				
Barrel diameter	4½	4½	5½	5½
Flange diameter	9½	11½	11½	11½
Bolt circle diameter	8½	10	10	10
Brakes				
Service—Diameter	14	15½	16½	18
Service—Width	2½	2½	3	3
Emergency—Diameter	13½	15	16	17½
Emergency—Width	1½	2	2	2
Bearings				
Bevel Pinion—Outer N. D.....	306	306	307	308
Bevel Pinion—Inner N. D.....	1406	1406	1407	1408
Differential—Right hand Hyatt ..	26219	18367	26084	26084
Differential—Left hand N. D....	208	209	210	210
Jackshaft Pinion—N. D.....	1406	1406	1407	1407
Wheel—Outer Bower	336TL	3554T	309N	4554T
Wheel—Inner Bower	4554T	4553T	5551T	5553T



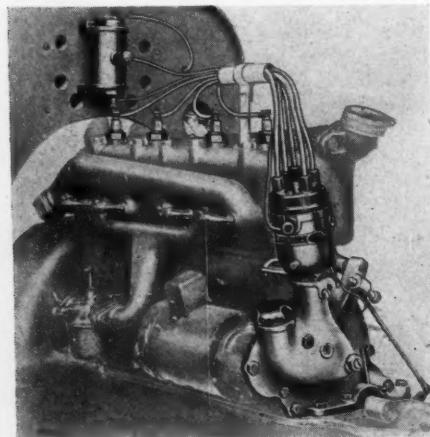
Mechanical View, Showing Details of Construction. All Russel Models Possess the Same Characteristics.

Bosch Battery Ignition System for Fords

Closely following the announcement that the makers of the Bosch Magneto were prepared to supply Battery Ignition Systems for automotive engines comes the news that the same firm is now manufacturing a remarkably efficient Battery Ignition Outfit for Fords.

This outfit is a simple but ingenious system. In designing it, the Corporation's engineers put Ford engines on the test bench and, with the aid of dynamometers, plotted the curve of spark advance which should be followed to develop greatest efficiency at all engine speeds from starting to maximum. They then designed the Bosch Compensating Governor so that it would regulate the spark advance, making it follow that curve without any assistance whatever from the driver.

The only time that the driver has to touch the spark lever is to retard it when starting, advancing it to the best running position as soon as the engine is operating. After that he may drive slowly or at top speed, up or down hills, over smooth roads, or through deep sand, without having to touch the spark lever. The Compensating Governor times the spark



View Showing Installation of the New Bosch Battery Ignition System for Fords. Every Unit of the Outfit is shown

to secure greatest efficiency from the engine under the load being put on it at that moment.

The Bosch Coil, built of the high grade materials, is wound just as carefully and insulated just as well as Bosch Magneto armature windings. The spark it produces is intense. Although the standard spark test gap is five millimeters in width, this system is claimed to throw a spark over twelve millimeters, even at the highest Ford engine speed.

The Bosch Interrupter, or Contact Breaker, is simple and durable. It is properly adjusted at the factory and need not be altered until the engine has gone many thousand miles. When an adjustment is to be made, it can be done quickly and easily without throwing out the timing of the spark.

The Bosch Battery Ignition System is said to have these advantages: First, it develops maximum efficiency at all engine speeds. Second, it makes the engine op-

erate smoothly, regardless of speed. Third, it gives additional economy through a saving in gas, oil and wear, also reducing the drain on the battery through easy starting. The intensity of the spark is asserted to insure a rapid and complete combustion of the gas in the cylinders. There is no waste of gas through misfiring, no necessity for rich mixtures and no heavy consumption of oil.

Fourth, it gives added power, due to increased efficiency of the engine. This makes the car faster on the open road, a better hill climber and more powerful in the sandy stretches. Fifth, it makes the engine more dependable, start more easily and operate more efficiently.

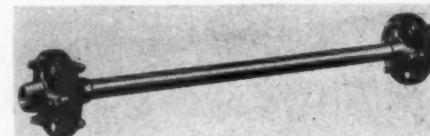
Snead Cushion Drive Shaft Units

Through the use of electrically heat treated nickel alloy steel tubing of light gage, Snead Cushion Drive Shaft Units, manufactured by Snead & Co., Jersey City, N. J., are exceptionally light in weight. The tubing used has a thin wall but a greater tensile strength and higher elastic limit than that provided by medium carbon steel tubing.

It was used extensively during the war period by aeroplane manufacturers for shafting, landing gear struts, braces, etc. The introduction of this tubing into the automotive industry met with almost immediate success because of its light weight and great strength. These features made it a decidedly important factor in the development of a thoroughly efficient propeller shaft unit for cars, motor trucks and tractors.

The Snead Cushion Drive embodies the flexible disk type of universal joint. Forged steel spiders are driven on either end of the tubing. A hexagonal wedge-shaped plug is then driven into the end of the tubing, forcing the end of tube into a hexagonal shaped recess on the inner side of the forging. The three component parts are then arc welded together. This is said to result in a positive method of attaching tubing to spider forgings.

No spline or slip joint is asserted to be necessary with the disk joint, as the end



Great Tensile Strength and High Elastic Limit Claimed for This Drive Shaft

movement along the shaft as well as the motor power is absorbed through the flexible rubber and fabric disks.

Two additional forged steel spiders are used at either end of the shaft in place of companion flanges. The disks are bolted to the spider feet with spacing washers between each to insure proper gripping of the fabric disks.

The joints require no lubrication, are noiseless in operation, and by absorbing motor impulse and shock along the shaft, they are claimed to result in much longer life in engine, transmission and axle gears and bearings.

Airco Ignition Gage

The Airco Ignition Gage is a compact vest pocket instrument about the size of a man's finger. It enables any motorist to detect instantly faulty spark plugs, and to locate short-circuits and leaks of current in the wiring between the plugs and the coil, or magneto.

The gage consists of an insulating hard rubber shell into which is packed a sensitized tube of Neon. Neon is an element of air, small in comparative quantity, and a very active conductor of electricity. When the metal cap, which permanently seals one end of the gage, is brought into contact with a high-tension electric current, the Neon becomes luminous and emits flashes of orange-red light, visible through the indicator in the side of the case.

To operate, hold the rubber end of the gage between the thumb and fingers and touch the metal end to the top of the spark plug, while the engine is running. From the frequency, regularity and comparative intensity of the orange-red light in the gage, the condition of the plug and its working efficiency can be determined. Apply the gage to each plug in turn and compare the indications as follows:



Manner in Which the Airco Ignition Gage is Employed in Determining the Location of Trouble

No flash—plug foul, or no current. Irregular flash—plug missing fire. Dim flash—plug partly foul or broken. To determine which condition exists, slowly withdraw gage from top of plug. If flashes cease at once, spark gap is too narrow, indicating partly foul plug. If flashes persist when gage is half inch or more away, look for broken plug—particularly broken porcelain. Bright flash—plug and circuit O. K. Very intense flash—gap too wide.

If the flash remains dim when the spark plug is known to be in good working order, it indicates lack of compression in the cylinder. Sparks are always hotter and indications from the gage brighter, if cylinder compression is high.

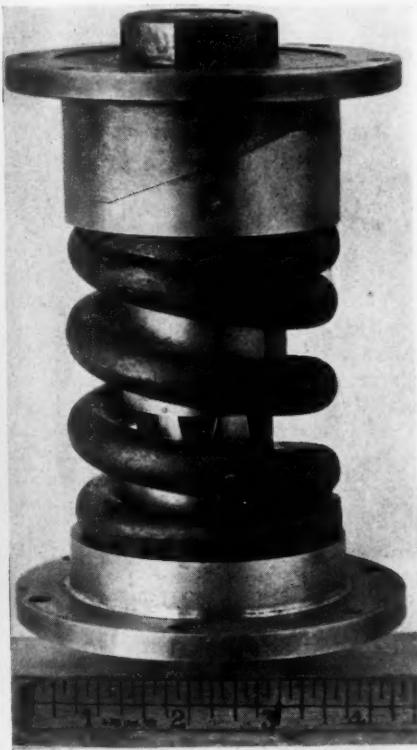
The Airco Ignition Gage is manufactured by the Air Reduction Co., New York City, and sales are handled by the Edward A. Cassidy Co., Inc., 25 West 43rd St., New York, N. Y. The price is \$1.

Flexo Mechanical Torsional Equalizer for Propeller Shaft

The Flexo Torsional Equalizer offered by the Flexo-Motive Corp., McCormick Bldg., Chicago, Ill., is a new form of spring drive for cushioning the transmission mechanism against shock. No matter whether the torque is right or left, from engine, or drive wheels, this coupler will render the operation of the machine softer, smoother and more flexible.

The Flexo equalizer is adaptable to any make car or truck. Successful performance is assured by reason of the fact that it consists of but few parts and that it is self-contained and enclosed and can be loaded with grease when loaded.

The mechanism consists of a splined shaft over which a sliding collar is fitted.



By Studying the Illustration and the Accompanying Description the Principle of the Flexo Equalizer Will be Readily Understood.

The shaft and collar therefore turn together at all times, but the collar may move along the shaft. Between the two is a stout helical spring which is compressed by the movement of the collar. A second flanged collar is mounted on the end of the shaft and left free to turn on it. Its inner face carries a face cam, corresponding in form with a face cam on the outside of the first mentioned collar. Hence, as the outer collar is rotated with respect to the shaft it causes the inner one to move longitudinally, thus compressing the spring by an amount proportionate to the relative rotation of the parts. The single coil spring assumes the entire work of softening shocks.

The parts allow an angular displacement of 70 deg., within which the spring is compressed 13-16 of an inch.

Thus equipped not only does a car or

truck start more easily, regardless of the speed of clutch engagement, but it seems to roll more quietly. At a standstill with the low gears engaged the clutch may be dropped in without stalling the engine. Again, it is possible to reverse the car from a slow back speed to a forward course by slamming in the clutch without stalling the engine or without perceptible shock.

Schmidt Motor Truck Traction Devices

The Charles D. Schmidt Co., Inc., Broadway, corner Canal St., New York City, in offering its patented unit anti-skid devices is really offering a unit permitting three positions of wear. These units may be placed on a wheel to form unit anti-skid devices anchored, a semi-floating anti-skid device anchored and a full-floating anti-skid device. The first two assemblies are, because of the nature of their attachment, positively safe against loss in event of a broken unit.

Multiples of a unit for a given size of tire may be assembled to form the various combinations for the given tire or wheel.

One Schmidt unit consists of a chain, the length of which is determined by the size of the tire to be equipped, and two patent-



Schmidt Chain Units Arranged for the Anchor Type of Assembly

ed hooks, so designed and constructed to provide a quick means of attaching the chain units and to prevent their accidental disengagement. The peculiar formation of the hook is said to protect the tip from injury and prevent the escape of the link in which it is hooked. The hook is made of dropped forged steel.

In the first type of assembly the anchored units may be used in any desired number. One may be placed at each spoke, or alternate spoke according to the service desired or necessary. The only part subject to wear is the traction part between the tire and the road. When the traction section is worn the position of the chain may be reversed to throw the wear on the other end. The units are readily attached or detached and may be shifted to different positions on the wheel so as not to bring undue wear on the tire at any given point. Automatic adjustment is claimed to give proper chain grip without injury to the tire.

Six units are generally employed in the semi-floating type of assembly, although more may be added if desired. Worn chain parts may also be reversed in this assembly. The maker points out that the ring on the side of the wheel around the hub prevents the hooks from creeping toward the tire tread. The feature of this

assembly is that should the chain break at the tread, the side ring will hold the pieces throwing them to the outside of the wheel away from running gear.

The full floating type is suited to disk wheels particularly and are said to have the advantage of detaching at any part. When once assembled they may be retained in that form. This ring, also, prevents hook creeping. The full-floating type of assembly is devised where brake rod or other parts are too close to the wheel to give sufficient clearance.

Schmidt chains may be utilized for a number of other purposes, such as: sling



Showing Schmidt Anti-Skid Units Assembled in Three Positions of Wear. They Are: Upper, Anchored Type; Center, Semi-Floating Type, and, Lower, Full-Floating Type.

chains, tow chain, mud chain, pull out chain, tail-board chain, rung chain, loading chain, and hoisting chain. The units can be made into endless chains or chains of any length.

These chains are offered in any size for any service. The list prices per unit for solid single tires range from \$1 for a 3-in. tire to \$2.60 for a 14-in. tire; and for solid dual tires from \$1.30 for a 2 1/2-in. tire to \$2.60 for a 7-in. tire.

This company also manufactures heavy-service brake lining made of pure asbestos and interwoven with brass wire in standard and special sizes, as well as heavy-service disk clutch facings.

Service Associations Launch Plan to Advertise for Winter Business

SERVICE Station Managers, as well as the proprietors of the independent repair shop and garage, realize that the average owner defers adjustments and repairs, or a general overhaul, until conditions actually require the work. While this is particularly true of the passenger car the owners of which delay until late winter or early spring, it is a condition that may be said to obtain with the truck.

Old Overhead Keeps on Working

The service manager building up an efficient staff of mechanics and installing time and labor-saving tools, machinery, etc., finds it necessary to lay off men in dull season because the overhead must be reduced. These men have become, let us say, efficient with particular model or models and are, consequently, enabled to turn out better work and at less cost to the owner. Those laid off are later replaced by new men who not only have to become familiar with the units, but being largely of the floating type are not as efficient as the workman throughout the year.

With full knowledge of these conditions plus the desire to maintain the service station, repair shop and garages at normal, N. W. Durnin, a director of the Automotive Service Association, of Brooklyn, N. Y., brought before that organization a plan to sell truck and passenger car owners on the vital necessity of having necessary and other work performed during the fall months. The plan is a simple one. It consists of ADVERTISING, PLUS SELLING, which, after all, are the fundamentals of business. In brief, Mr. Durnin sold his fellow directors on the plan to start not less than a two months' advertising campaign in two of the leading newspapers in Brooklyn.

To Advertise Service to Educate

Twenty 600-line advertisements are to appear and to alternate in the newspapers. The copy is to be changed and will contain a punch to attract the owner of the truck and passenger car. The copy will also be educational and will endeavor to sell the owner on the need of consulting the service station as to work required on his car. These quarter-page advertisements will carry no name other than the Automotive Service Association of Brooklyn.

The expense of the campaign has been met by 40 dealers, service stations, repair shops, etc., entering into a contract with the association to pay \$75 each as per the agreement reproduced herewith. Each subscriber is to be supplied with 1000 folders or circulars, which are a follow-up to the advertisements, and which bear the emblem of the association, and have space for the subscriber's name and address. These folders are a two-color job, and those proposed carry a punch and

arguments that should attract the attention of the owner. As non-members participate in the plan these practically carry the endorsement of the association.

The Brooklyn association is to be congratulated for the speed with which it put over the campaign. The morning following the meeting teams of two men each called on the dealers, etc., and in less than 24 hours the campaign went over, and went over big, as those sold were enthusiastic over its possibilities.

The contract between the subscriber and the Automotive Service Association is as follows:

We hereby join you in the proposed advertising campaign by your Association, understanding that it is to be cooperative and for the benefit of members of the Association and non-members, its purpose being to educate car owners and seek to have repairs and adjustments made during the Fall rather than the Winter, and to establish a pleasant business relation between the car owners and members of your Association and the trade in general, from which mutual benefits may be derived.

We subscribe the sum of \$75 for that purpose, \$25 of which is herewith enclosed, and agree to pay the sum of \$10 each week for five succeeding weeks, for which you are to deliver to us 1000 printed circulars (like sample exhibited to us) free of charge, and will agree to sell us any number of additional thousand copies at \$5.75 per thousand for distribution to our customers during the advertisements appearing in Brooklyn Daily Eagle and Brooklyn Standard Union. You are to expend the sum of \$3000 in such advertising campaign by insertion of Twenty 600-line advertisements in those papers, Ten 600-line advertisements in each.

All monies subscribed over the necessary amount of expenditures will be returned to us pro rata.

New York Association Considers Plan

On Thursday evening, October 6, the Automotive Service Association of New York considered the advertising plan at its monthly meeting. N. W. Durnin explained how Brooklyn put it over, and he was followed by the agency representative preparing the copy and folder. Samples were displayed. The Executive Committee of the New York association had gone over the campaign previous to the meeting, and after some discussion it was decided to authorize the committee to work out details, etc. It is probable that the committee will appoint teams and that the sum to be expended on advertising will not be less than \$12,000. Frank Prestos, Packard Motor Co., New York, read a paper on Parts Department Control. The next regular meeting will be held November 3.

The Automotive Service Association of Newark began its season's work with a record-breaking attendance at its September 15 meeting. Plans were discussed for fall and winter work, after which the members listened to an address of C. M. Radley, of the Oakley Chemical Co., maker of Oakite. He gave a very interesting talk on cleaning problems, and at the conclusion questions were asked by the members and answered by the speaker, and by J. F. Tonn and A. P. Hinton of the same company.

The next meeting will be held October 20 and will be an open meeting at which there will be a discussion of insurance problems by an insurance expert. Effort is to be made to secure a film, also entertainers, for this meeting. The November meeting occurring on the 17th, will be given over to the annual fall dinner.

Pirate Parts to be Discussion at Next Service Convention

The fifth semi-annual meeting of the service managers of truck, passenger car and tractor factories will be held in New York City, November 15 and 16, unless the dates are changed by the committee which is in session at Cleveland at the time this article was written. There is every reason to believe, however, that these dates will stand.

Secretary Cobleigh of the N. A. C. C. is working strenuously in preparing a program, and it is believed that the meeting will be even better than the event held at Buffalo last fall. Instead of reading a large number of papers it is proposed to have more open discussions on subjects dealing with service and its various angles. It is expected that such a program will produce results.

One of the subjects that will be threshed out will be "pirate parts." The increasing use of parts other than those of the manufacturer of the truck and passenger car, to say nothing of equipment products, is viewed with alarm by the manufacturers and by the factory service managers. Some allege that the dealers are having component parts, such as piston pins, axle shafts, pinions, gears, etc., manufactured by other than the parts makers. Some dealers claim that they can secure equally as good component parts at a cost much less than the factory price. This enables the dealer to make a greater profit, for invariably the factory list price of the part is charged the customer, say the factory service men.

There is no denying the fact that the use of parts other than those made by the parts maker for the truck manufacturer and passenger car maker is a problem that must be given serious consideration by the manufacturer. If the dealer or owner used parts equally as

good in so far as material, workmanship and limits were concerned the problem would not, perhaps, be so serious, but it is stated that much inferior material, a price product, frequently finds its way into the chassis, and, not giving proper service, reflects upon the product of the truck maker.

It may be that some attempt will be made to define what is a pirate part at the meeting next month, which, if attempted, will prove interesting, as opinion differs on this subject. Irrespective of the definition arrived at, there is this thought, and that is, that service is one

of the factors responsible for the use of other than genuine parts, and that shortage of parts during the war developed or increased the use of parts other than those supplied by the truck and car maker.

Indications point to a well-attended meeting, as more manufacturers appreciate the value of service and its relation to sales than formerly. If the plan of fewer papers and more open discussion of timely and pertinent subjects is adhered to, the meeting should prove the most interesting of any held by the men who are connecting link between dealers and factory in the replacement business.

Akron and vicinity, where there are some fearful and wonderful buses in operation.

The traction officials state that these buses will cost \$7500 each.

Operation of these pioneers in the field of combined bus and street car transportation will be watched with keenest interest by both motor truck manufacturers and traction interests, and it is not too much to believe that this first installation is but the forerunner of hundreds of similar installations all over the country.

Correction

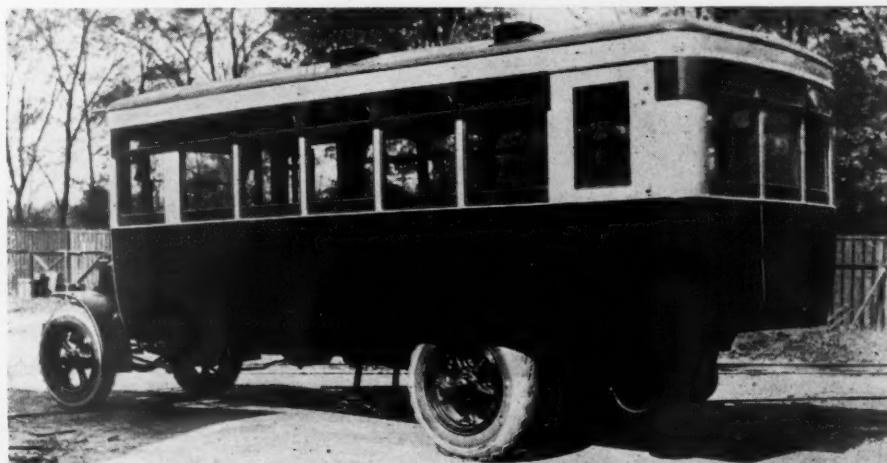
(Truck Grip Chains)

In the description of the Truck-Grip Chain Co., Inc., 2 Columbus Circle, New York City, product, known as Truck Grip chains, which appeared in the September issue of the Commercial Car Journal, page 39, a discrepancy in price was inadvertently made. The following price list is correct:

For Solid Single Tires					
3½ in.	\$16.00	1	Ton	5-16 in.	Chain
4 "	18.00	1½	"	5-16	"
5 "	21.00	2	"	11-32	"
6 "	23.00	2	"	11-32	"
7 "	25.00	2	"	11-32	"
8 "	27.00	3	"	3-8	"
10 "	30.00	3½	"	13-32	"
12 "	32.00	5	"	13-32	"
14 "	40.00	7	"	7-16	"
For Solid Dual Tires					
3½ in.	\$22.00	2	Ton	11-32 in.	Chain
4 "	25.00	2	"	3-8	"
5 "	30.00	3	"	13-32	"
6 "	35.00	5	"	13-32	"
7 "	40.00	7	"	7-16	"

A set of Truck Grip chains consists of two retaining rings, 12 U-bolts and 12 cross chains, each having two snaps.

These chains are featured because of the ease and facility with which they can be snapped on a wheel without the use of tools, or without moving the vehicle. Quick replacement of broken links is another feature. A large reduction in tire wear and the securing of low chain upkeep is said to result from the creeping of the chains between the spokes. This is claimed to be a characteristic peculiar only to Truck Grip chains.



Type of Bus Taken Over by the Akron Traction Company

ORDERS have been placed by the Northern Ohio Traction Co. for twelve motor buses to be used as an integral part of the street car system at Akron, Ohio, where they will be run on routes radiating from the outer terminals of the present city tracks.

This is the first time in the history of automotive transportation that an electric street car company in the United States has purchased motor buses and made them an integral part of its transportation system, and it marks an epoch in the history of the motor truck. Of privately owned buses there have been many, and traction interests have united in doing everything they could to either stop their operations or divert them to routes where they would not be in competition with their own cars.

Evidently the Northern Ohio Traction Company officials have seen the futility of trying to stop a method of transportation that has come to stay, and are therefore adopting it as their own.

Akron built up wonderfully during the war period, and today has a number of suburbs lying on the very edge of the city which are not served by car lines. Cost of building into these suburbs from the terminals of existing lines has proved prohibitive under present conditions, and so the electric line officials have decided to bring these residents into touch with their city lines with the motor buses.

The fare on the buses will be the same as on the street cars, and transfers will be issued to bus passengers entitling them to ride anywhere on the city cars.

The transfer privilege will make competition prohibitive, as private motor buses, unable to give transfers to the street car lines, could not secure enough business to keep them in operation.

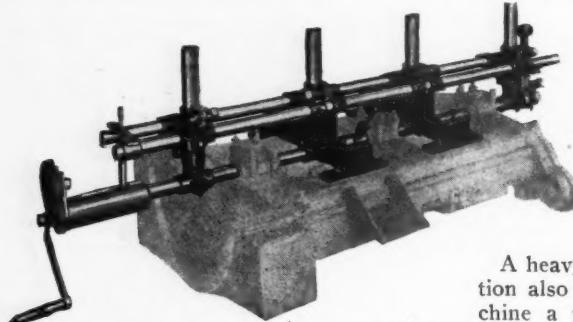
The new buses will be of the very latest type, and contracts have been placed with the C. G. Kuhlman Car Co., of Cleveland, for the vehicles. The Kuhlman company has long been one of the foremost manufacturers of electric street cars in the country, and its officers have

Service Station and Repair Shop Appliances

Peters Universal Bearing Reamer

Peters, Inc., Widener Bldg., Phila., Pa., is offering to the trade a reamer that is universal for all types of engines. The maker points out that the design is such as to permit the reamer to be positively held in a definite position or alignment in relation to the timing gears. Its adjustments are claimed to be practically fool-proof.

The boring bar is of the fly-cutter type and the adjustment of this cutter is deter-



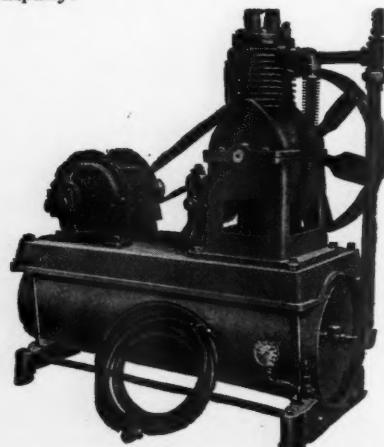
Showing How the Peters Universal Bearing Reamer is Mounted

mined by a special micrometer, which is furnished specially for this purpose. The cutter used is of ordinary $\frac{1}{4}$ -in. tool steel stock and it is also equipped with a jig for reaming connecting rods.

This reamer is also well adapted for such work as rebabbitting main and connecting rod bearings. The price is \$250.

Curtis Two-Stage Air Compressor

The new Curtis style "V" stationary two-stage motor-driven air compressor, put out by the Curtis Pneumatic Machinery Co., St. Louis, Mo., embodies the same fundamental features contained in this company's single stage compressor. This model is representative of the new line being produced by this well-known company.



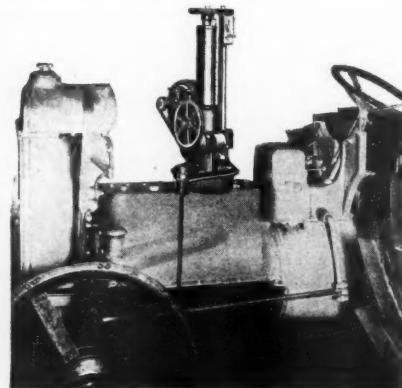
Curtis Style V Air Compressor

Storm Motor Driven Reboring Machines

The new Storm motor driven cylinder reboring machine, offered by the Storm Mfg. Co., 406 6th Ave., S., Minneapolis, Minn., is designed to meet the requirements of the average size garage where electricity is available.

Machine is of heavy and rigid construction throughout. It is used with Storm power machine cutter heads. The heads are supported by a rigid, hardener steel bar, ground to exact size. Heavy machine bearings support the bar. These bearings are adjustable so as to take up any play and can be easily kept in perfect adjustment. Cutter gears are used throughout and a heavy internal feed screw and feed bar. Total capacity is $2\frac{1}{2}$ to 6 feet. Weight, about 300-lb.

A heavy base not shown in the illustration also is provided for making the machine a permanent and convenient shop fixture if desired. Yet, it can be used independent of the base.



Storm Reboring Machine Prepared for Work

The machine is furnished for boring only or for both boring and burnishing. The burnishing head consists of a hardened steel arbor having a special shank to fit boring bar, surrounded by special tool steel rollers held in special roller housing.

In using the burnishing heads, the cylinders are first bored slightly under the desired finished size. After all the cylinders of the block have been bored to this size the cutter head is removed and the burnishing head is substituted. The rollers work in oil and pass through the cylinder, compressing the metal by crowding it back, thus giving the cylinder walls a hard and polished smoothness.

Machine Welding Torch With Special Tip for Metal Welding.

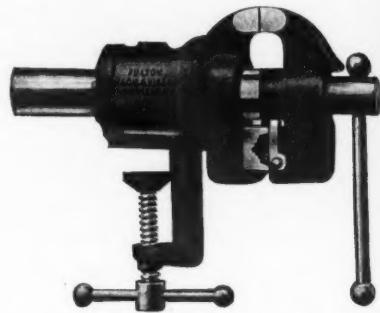


F. & R. Combination Special Vise

The F. & R. Combination Special Vise, manufactured by Fulton Machine & Vise Co., Lowville, N. Y., because of its wide adaptability, could well be termed an all-purpose vise. Its combination of jaws and shear and its many adjustments for various types of work are its big features.

Two sets of jaws are provided for use on round and square work. Either set of jaws can be used on top or at any angle, and locked.

It is highly finished with gloss French gray enamel.



F. & R. Combination Special Vise

Bay State Wrench Set

The wrench outfit offered by the Bay State Pump Co., Boston 27, Mass., designated as set No. 10, consists of five hex broached steel sockets with an L handle and a waterproofed bag with snap fastener. The sizes of the sockets are as follows: $\frac{1}{2}$, 19-21, 21-32, 23-32, and 25-32. The price is \$1.50 per set, and the shipping weight, 1 lb., 7 oz.

Machine Welding Torch With Special Tip

The Torchweld Equipment Co., Fulton & Carpenter Sts., Chicago, Ill., makes the announcement that its recent addition to its line is especially suited for service station use. It is a machine welding torch with a special tip for metal welding. This specially designed tip is declared to be particularly valuable to repairmen in a variety of welding work.

Other noteworthy features of construction are that it is water cooled, has a valve that allows the torch to be shut off without interfering with the adjustment of the oxygen or acetylene needle valve and is firmly constructed to insure longevity and effective service.

Replacement Table—Corrected Monthly

Including Piston Ring Sizes, Carburetor Sizes, Hose Sizes, Fan Belt Sizes, Brake Lining Sizes and Truck Frame Dimensions

Note: Under Carburetor Inlet Diameter Will be Found Either the Size of Main Air Intake or the Gasoline Fuel Line

Fan Belt Type: V—V-Shape, F—Flat, R—Round

Name, Model and Tonnage	ENGINE								BRAKE LINING					FRAME											
	No. per Col.	Piston Rings		Carburetor		Upper Hose		Lower Hose		Fan Belt		Service		Emergency		Length	Width								
		Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces							
Acason R-1—1920.	4	1	1	1	1	10 $\frac{1}{2}$	2 $\frac{1}{2}$	6 $\frac{1}{2}$	2	37 $\frac{1}{2}$	1	F	11 $\frac{1}{2}$	3	1 $\frac{1}{2}$	2	11 $\frac{1}{2}$	3	1 $\frac{1}{2}$	2	112	34			
Acason RB-1 $\frac{1}{2}$ —1920.	4	1	1	1	1	10 $\frac{1}{2}$	2 $\frac{1}{2}$	5 $\frac{1}{2}$	2	33	1 $\frac{1}{2}$	F	11 $\frac{1}{2}$	3	1 $\frac{1}{2}$	2	11 $\frac{1}{2}$	3	1 $\frac{1}{2}$	2	112	34			
Acason H-2 $\frac{1}{2}$ —1920.	3	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	10 $\frac{1}{2}$	2 $\frac{1}{2}$	5 $\frac{1}{2}$	2	33	1 $\frac{1}{2}$	F	11 $\frac{1}{2}$	3	1 $\frac{1}{2}$	2	13 $\frac{1}{2}$	3	1 $\frac{1}{2}$	2	130	35			
Acason L-3 $\frac{1}{2}$ —1920.	3	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	10 $\frac{1}{2}$	2 $\frac{1}{2}$	5 $\frac{1}{2}$	2	16	3 $\frac{1}{2}$	F	11 $\frac{1}{2}$	3	1 $\frac{1}{2}$	2	16	3 $\frac{1}{2}$	1 $\frac{1}{2}$	2	163 $\frac{1}{2}$	35			
Acason M-5—1920.	3	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	10 $\frac{1}{2}$	2 $\frac{1}{2}$	5 $\frac{1}{2}$	2	18	4 $\frac{1}{2}$	F	11 $\frac{1}{2}$	3	1 $\frac{1}{2}$	2	18	4 $\frac{1}{2}$	1 $\frac{1}{2}$	2	167 $\frac{1}{2}$	35			
Acme Series A 1 $\frac{1}{2}$ —1920.	3	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	10 $\frac{1}{2}$	2 $\frac{1}{2}$	5 $\frac{1}{2}$	2	18	4 $\frac{1}{2}$	F	11 $\frac{1}{2}$	3	1 $\frac{1}{2}$	2	18	4 $\frac{1}{2}$	1 $\frac{1}{2}$	2	122 $\frac{1}{2}$	32			
Acme Series A 2 $\frac{1}{2}$ —1919-20.	4	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	10 $\frac{1}{2}$	2 $\frac{1}{2}$	5 $\frac{1}{2}$	2	18	4 $\frac{1}{2}$	F	11 $\frac{1}{2}$	3	1 $\frac{1}{2}$	2	18	4 $\frac{1}{2}$	1 $\frac{1}{2}$	2	144 $\frac{1}{2}$	32			
Acme G- $\frac{1}{2}$.	3	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	11	2	11	2	38 $\frac{1}{2}$	1 $\frac{1}{2}$	F	12	3 $\frac{1}{2}$	1 $\frac{1}{2}$	2	13 $\frac{1}{2}$	3	1 $\frac{1}{2}$	2	110 $\frac{1}{2}$	34			
Acme B-1 $\frac{1}{2}$ —1916-20.	3	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	11	2	11	2	38 $\frac{1}{2}$	1 $\frac{1}{2}$	F	12	3 $\frac{1}{2}$	1 $\frac{1}{2}$	2	13 $\frac{1}{2}$	3	1 $\frac{1}{2}$	2	110 $\frac{1}{2}$	34			
Acme F-1 $\frac{1}{2}$ —1919-20.	3	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	11	2	11	2	38 $\frac{1}{2}$	1 $\frac{1}{2}$	F	12	3 $\frac{1}{2}$	1 $\frac{1}{2}$	2	13 $\frac{1}{2}$	3	1 $\frac{1}{2}$	2	123 $\frac{1}{2}$	34			
Acme A-2—1916-20.	3	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	11	2	11	2	38 $\frac{1}{2}$	1 $\frac{1}{2}$	F	12	3 $\frac{1}{2}$	1 $\frac{1}{2}$	2	13 $\frac{1}{2}$	3	1 $\frac{1}{2}$	2	135	34			
Acme AC-2 $\frac{1}{2}$ —1921.	3	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	12	2	11	2	33 $\frac{1}{2}$	1 $\frac{1}{2}$	F	13	3 $\frac{1}{2}$	1 $\frac{1}{2}$	2	13 $\frac{1}{2}$	3	1 $\frac{1}{2}$	2	140 $\frac{1}{2}$	34			
Acme C-3 $\frac{1}{2}$ —1917-20.	3	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	11 $\frac{1}{2}$	2	11	2	33 $\frac{1}{2}$	1 $\frac{1}{2}$	F	13	3 $\frac{1}{2}$	1 $\frac{1}{2}$	2	13 $\frac{1}{2}$	3	1 $\frac{1}{2}$	2	150 $\frac{1}{2}$	36			
Acme E-5—1919-20.	3	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	11 $\frac{1}{2}$	2	11	2	40 $\frac{1}{2}$	2	F	18	4	1 $\frac{1}{2}$	2	15 $\frac{1}{2}$	3	1 $\frac{1}{2}$	2	159 $\frac{1}{2}$	37			
American 25-2 $\frac{1}{2}$.	4	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	19	1 $\frac{1}{2}$	11	2	38	2	F	57	2 $\frac{1}{2}$	1 $\frac{1}{2}$	2	41 $\frac{1}{2}$	2 $\frac{1}{2}$	1 $\frac{1}{2}$	2	142	33			
American 40-4.	4	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	19	1 $\frac{1}{2}$	9 $\frac{1}{2}$	1 $\frac{1}{2}$	38	2	F	57	2 $\frac{1}{2}$	1 $\frac{1}{2}$	2	41 $\frac{1}{2}$	2 $\frac{1}{2}$	1 $\frac{1}{2}$	2	142	37			
American 50-5.	4	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	19	1 $\frac{1}{2}$	9 $\frac{1}{2}$	1 $\frac{1}{2}$	38	2	F	57	2 $\frac{1}{2}$	1 $\frac{1}{2}$	2	41 $\frac{1}{2}$	2 $\frac{1}{2}$	1 $\frac{1}{2}$	2	158	37			
Apex C-1.	3	1 $\frac{1}{2}$	1	1	V	V	7 $\frac{1}{2}$	2	12	2	36 $\frac{1}{2}$	1 $\frac{1}{2}$	F	42	2	2	41 $\frac{1}{2}$	2	2	2	102	35 $\frac{1}{2}$			
Apex D-1 $\frac{1}{2}$.	3	1 $\frac{1}{2}$	1	1	V	V	7 $\frac{1}{2}$	2	12	2	36 $\frac{1}{2}$	1 $\frac{1}{2}$	F	42	2	2	41 $\frac{1}{2}$	2	2	2	102	35 $\frac{1}{2}$			
Apex E-2 $\frac{1}{2}$.	4	1 $\frac{1}{2}$	1	1	V	V	7 $\frac{1}{2}$	2	12	2	32	1	F	54	2 $\frac{1}{2}$	2	53 $\frac{1}{2}$	2	2	2	128	31 $\frac{1}{2}$			
Apex G.	3	1 $\frac{1}{2}$	1	1	V	V	12	2	15 $\frac{1}{2}$	2	34 $\frac{1}{2}$	1 $\frac{1}{2}$	F	42	2	2	41 $\frac{1}{2}$	2	2	2	102	35 $\frac{1}{2}$			
Armleder 20.	4	1 $\frac{1}{2}$	1	1	V	V	13	1 $\frac{1}{2}$	16 $\frac{1}{2}$	1	31 $\frac{1}{2}$	2	F	11 $\frac{1}{2}$	3	1 $\frac{1}{2}$	2	11 $\frac{1}{2}$	3	1 $\frac{1}{2}$	2	104 $\frac{1}{2}$	32		
Armleder KW-3 $\frac{1}{2}$ —1916-21.	4	1 $\frac{1}{2}$	1	1	V	V	12 $\frac{1}{2}$	1	16 $\frac{1}{2}$	1	36	2	F	42	3	1 $\frac{1}{2}$	2	16	3	1 $\frac{1}{2}$	2	150	36		
Armleder HW-2 $\frac{1}{2}$ —1916-21.	4	1 $\frac{1}{2}$	1	1	V	V	10	1 $\frac{1}{2}$	11 $\frac{1}{2}$	1	34	2	F	13 $\frac{1}{2}$	3	1 $\frac{1}{2}$	2	13 $\frac{1}{2}$	3	1 $\frac{1}{2}$	2	109 $\frac{1}{2}$	32		
Atco B-1 $\frac{1}{2}$.	4	1 $\frac{1}{2}$	1	1	V	V	11	2	11	1	31 $\frac{1}{2}$	2	F	25 $\frac{1}{2}$	2 $\frac{1}{2}$	1 $\frac{1}{2}$	2	18	4	1 $\frac{1}{2}$	2	109 $\frac{1}{2}$	32		
Atco B-1 $\frac{1}{2}$.	4	1 $\frac{1}{2}$	1	1	V	V	11	2	11	1	31 $\frac{1}{2}$	2	F	46	2 $\frac{1}{2}$	1 $\frac{1}{2}$	2	24	1 $\frac{1}{2}$	1 $\frac{1}{2}$	2	124 $\frac{1}{2}$	33		
Atlas 21-1.	4	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	12	2	11	1	33 $\frac{1}{2}$	1 $\frac{1}{2}$	F	25 $\frac{1}{2}$	2 $\frac{1}{2}$	1 $\frac{1}{2}$	2	1	22 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	2	84 $\frac{1}{2}$	33 $\frac{1}{2}$		
Atterbury 20R-1 $\frac{1}{2}$ —1920.	4	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	8	1 $\frac{1}{2}$	14	1 $\frac{1}{2}$	38 $\frac{1}{2}$	1 $\frac{1}{2}$	F	11 $\frac{1}{2}$	3	1 $\frac{1}{2}$	2	11 $\frac{1}{2}$	3	1 $\frac{1}{2}$	2	122 $\frac{1}{2}$	34			
Atterbury 7CX-2 $\frac{1}{2}$ —1919-20.	3	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	5 $\frac{1}{2}$	1 $\frac{1}{2}$	6 $\frac{1}{2}$	1 $\frac{1}{2}$	30 $\frac{1}{2}$	1 $\frac{1}{2}$	F	13 $\frac{1}{2}$	3	1 $\frac{1}{2}$	2	13 $\frac{1}{2}$	3	1 $\frac{1}{2}$	2	133 $\frac{1}{2}$	34			
Atterbury 7D-3 $\frac{1}{2}$ —1917-20.	3	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	8	1 $\frac{1}{2}$	6	1 $\frac{1}{2}$	30 $\frac{1}{2}$	1 $\frac{1}{2}$	F	15 $\frac{1}{2}$	3	1 $\frac{1}{2}$	2	15 $\frac{1}{2}$	3	1 $\frac{1}{2}$	2	145 $\frac{1}{2}$	37 $\frac{1}{2}$			
Atterbury 8F-2—1919-20.	3	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	14	2	20 $\frac{1}{2}$	2	40	2	F	17 $\frac{1}{2}$	4	1 $\frac{1}{2}$	2	17 $\frac{1}{2}$	4	1 $\frac{1}{2}$	2	157 $\frac{1}{2}$	37 $\frac{1}{2}$			
Autocar XXI-F-2—1915-20.	4	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	3	1 $\frac{1}{2}$	4	1 $\frac{1}{2}$	48 $\frac{1}{2}$	1 $\frac{1}{2}$	F	25 $\frac{1}{2}$	2 $\frac{1}{2}$	1 $\frac{1}{2}$	2	25 $\frac{1}{2}$	2 $\frac{1}{2}$	1 $\frac{1}{2}$	2	176	34 $\frac{1}{2}$			
Autocar XXVI-Y-4—1920.	3	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	3 $\frac{1}{2}$	1 $\frac{1}{2}$	3	1 $\frac{1}{2}$	48 $\frac{1}{2}$	1 $\frac{1}{2}$	F	25 $\frac{1}{2}$	2 $\frac{1}{2}$	1 $\frac{1}{2}$	2	25 $\frac{1}{2}$	2 $\frac{1}{2}$	1 $\frac{1}{2}$	2	120	32			
Available H-1 $\frac{1}{2}$ —1920.	4	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	11	1 $\frac{1}{2}$	14	1 $\frac{1}{2}$	40	2	F	48	2	2	25	2 $\frac{1}{2}$	1 $\frac{1}{2}$	2	25	2 $\frac{1}{2}$	1 $\frac{1}{2}$	2	120	32
Available H-2 $\frac{1}{2}$ —1916-20.	3	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	11	1 $\frac{1}{2}$	14	1 $\frac{1}{2}$	40	2	F	36	2 $\frac{1}{2}$	1<math										

Replacement Table—Continued

Name, Model and Tonnage	ENGINE										BRAKE LINING						FRAME				
	Piston Rings		Carburetor		Upper Hose		Lower Hose		Fan Belt				Service			Emergency			Length	Width	
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	No. per Cyl.
Columbia G-2½—1921	3	1	1	1	V	11	1	10	1	38	1	F	55	3	2	50	2	132	32		
Commerce T-1500	3	1	1	1	V	10	2	2	2	44	1	V	50	4	48½	2	92	32			
Commerce 12-3000	3	1	1	1	V	10	2	2	2	44	1	V	45	4	43	2	99	32			
Commerce 16-4000	3	1	1	1	V	10	2	2	2	44	1	V	45	4	43	2	108	32			
Concord A-2—1921	4	1	1	1	H	11	2	2	2	34	2	F	12	4	12	4	108	32			
Concord AX-2—1921	4	1	1	1	H	11	2	2	2	34	2	F	12	4	12	4	122	32			
Concord B-3—1921	4	1	1	1	H	11	2	2	2	34	2	F	13½	4	13½	4	122	32			
Concord BX-3—1921	4	1	1	1	H	11	2	2	2	34	2	F	13½	4	13½	4	155	32			
Corbitt E-1—1917-20	3	1	1	1	V	14	2	2	2	38	1	V	19	4	19	1	105	32			
Corbitt D-1½—1916-20	3	1	1	1	V	14	2	2	2	38	1	V	45½	2	2	1	45½	32			
Corbitt C-2—1915-20	3	1	1	1	V	14	2	2	2	36	1	V	51½	2	2	1	51½	32			
Corbitt B-2½—1916-20	3	1	1	1	V	14	2	2	2	36	1	V	51½	2	2	1	51½	32			
Corbitt AA-5—1919-20	3	1	1	1	V	13	1	1	1	36	1	V	69½	3	1	1	69½	32			
Corbitt A-3½—1917-20	3	1	1	1	V	13	1	1	1	36	1	V	64	2	2	1	64	32			
Cyclone A-3000	3	1	1	1	V	16	2	2	2	32½	1	F	21½	4	19½	2	113	32			
Dart H-1—1920-21	3	1	1	1	H	11	2	2	2	36	1	F	19	1	19	1	102	32			
Dart S-1½—1920-21	3	1	1	1	H	11	2	2	2	36	1	F	19	1	19	1	112	32			
Dart W-3½—1920-21	4	1	1	1	H	11	2	2	2	36	1	F	28	2	2	1	124	32			
Day Elder A-1	3	1	1	1	V	9	2	2	2	40	1	V	19	2	2	4	28	32			
Day Elder B-1½	3	1	1	1	V	9	2	2	2	40	1	V	19	2	2	4	19	32			
Day Elder D-2	3	1	1	1	V	4	1	1	1	35	1	V	45	2	2	2	45	32			
Day Elder C-2½	4	1	1	1	V	10½	2	2	2	36	1	F	52	2	2	2	52	32			
Day Elder F-3½	3	1	1	1	V	6½	1	1	1	35	1	F	56½	2	2	2	56½	32			
Day Elder E-5	3	1	1	1	V	12½	2	2	2	38	1	F	18	2	2	2	69	32			
Dearborn BW-2—1915-17-19-20	3	1	1	1	V	12	2	2	2	37	1	F	16½	2	2	2	18	32			
Dearborn C-1—1915-17-19-20	3	1	1	1	V	10	2	2	2	40	1	F	45	2	2	1	97½	32			
Defiance B-1½—1918-19-20	3	1	1	1	V	10	2	2	2	40	1	F	54	2	2	1	116	32			
Defiance C-2—1918-19-20	3	1	1	1	V	10	2	2	2	40	1	F	45	2	2	1	116	32			
Defiance D—1920-21	3	1	1	1	V	10	2	2	2	40	1	F	54½	2	2	1	120	32			
Defiance E—1920-21	3	1	1	1	V	6	2	2	2	38	1	F	49	2	2	1	97½	32			
Denby 31½—1921	3	1	1	1	V	12	2	2	2	42	1	V	53½	2	2	1	120	32			
Denby 33-1½—1921	3	1	1	1	V	12	2	2	2	35	1	V	53½	2	2	1	120	32			
Denby 134-2—1921	3	1	1	1	V	12	2	2	2	35	1	V	53½	2	2	1	127	32			
Denby 25-3—1921	3	1	1	1	V	12	2	2	2	35	1	V	53½	2	2	1	127	32			
Denby 27-4—1921	3	1	1	1	V	12	2	2	2	35	1	V	53½	2	2	1	140	32			
Denby 210-5—1921	3	1	1	1	V	13	2	2	2	37	1	F	89	2	2	1	140	32			
Dependable Dispatch A-1 1921	4	1	1	1	V	14	2	2	2	37½	1	F	53½	2	2	1	108	32			
Dependable C-1½—1920-21	4	1	1	1	V	14	2	2	2	37½	1	F	53½	2	2	1	121	32			
Dependable D-2 1920-21	4	1	1	1	V	10	2	2	2	37½	1	F	53½	2	2	1	140	32			
Dependable E-2½—1920-21	4	1	1	1	V	10	2	2	2	37½	1	F	63	2	2	1	152	32			
Dependable G-3½ 1921	4	1	1	1	V	13	2	2	2	37½	2	F	63	2	2	1	170	32			
Diamond T-O-3-1	3	1	1	1	V	9	1	1	1	35	2	F	48	2	2	2	33	32			
Diamond T-F&T-1½	3	1	1	1	V	9	1	1	1	35	2	F	11½	2	2	4	11½	32			
Diamond T-U-2	3	1	1	1	V	9	1	1	1	35	2	F	13½	2	2	4	13½	32			
Diamond TK-3½	3	1	1	1	V	10	1	1	1	35	2	F	15½	2	2	4	15½	32			
Diamond T-EL-5	3	1	1	1	V	10	1	1	1	35	2	F	18	2	2	4	17	32			
Diamond T-S-5	3	1	1	1	V	9	2	2	2	40	2	F	18	2	2	4	17	32			
Diesel A	3	1	1	1	V	7	2	2	2	38	1	F	28	2	2	2	27	32			
Doane 2½—1917-18-19-20	3	1	1	1	H	9	1	1	1	32	1	F	35	3	2	2	18	32			
Doane 3½—1920	3	1	1	1	H	12	1	1	1	38	1	F	35	3	2	2	156	32			
Doane 6—1917-18-19-20	3	1	1	1	H	15	1	1	1	43	1	F	38	3	2	2	47½	32			
Dodge Bros. ½—1920-21	3	1	1	1	H	7	1	1	1	31	1	F	19½	2	2	2	42	32			
D-Olt.	3	1	1	1	H	18	2	2	2	36	1	F	54	3	2	2	24	32			
Dorris K-4-2½—1918-20	3	1	1	1	V	2½	1	1	1	40	1	F	13½	2	2	2	40	32			
Dorris K-7-3½—1919-20-21	3	1	1	1	V	2½	1	1	1	40	1	F	15½	2	2	2	45	32			
Double Drive B3	4	1	1	1	V	10	2	2	2	40	1	F	29	2	2	2	24	32			
Douglas GW-1½	3	1	1	1	V	9	1	1	1	35	2	F	45	2	2	2	24	32			
Douglas G-1½	3	1	1	1	V	9	1	1	1	35	2	F	46	2	2	2	24	32			
Douglas H-2	3	1	1	1	V	10	1	1	1	35	2	F	55	2	2	2	24	32			
Douglas HW-2	3	1	1	1	V	10	1	1	1	35	2	F	55	2	2	2	24	32			
Douglas I-3	3	1	1	1	V	13	1	1	1	35	2	F	58	2	2	2	24	32			
Duplex E-3½	3	1	1	1	V	9	1	1	1	37	2	F	9½	2	2	2	5½	32			
Duplex A	3	1	1	1	V	10	2	2	2	42	2	F	2	2	2	2	22	32			
Duty 2—1921	3	1	1	1	V	7	2	2	2	38	1	F	45	2	2	2	40	32			
Eagle 100-2	4	1	1	1	V	14	2	2	2	33	2	F	49½	3	2	2	46	32			
Eagle 15—1920	3	1	1	1	V	15½	1	1	1	31	2	F	19½	1	1	1	120	30			
Eagle 2½—1917-20	3	1	1	1	V	10	1	1	1	34	2	F	13½	2	2	2	41	32			
Eagle 3½-4—1917-20	3	1	1	1	V	9	1	1	1	40	2	F	15½	2	2	2	159½	37½			
Eagle 5-6—1917-20	3	1	1	1	V	9	1	1	1	40	2	F	18	2	2	2	161½	37½			
Fargo O17, P18-2, P19-2, P20-2	3	1	1	1	V	10	2	2	2	42	2	F	52	3	2	2	50½	32			
Fargo R—1921	3	1	1	1	V	10	2	2	2	42	2	F	3	2	2	2	22	32			
Federal SD-1-1½	4	1	1	1	V	15	1	1	1	35	1	F	10½	3	2						

Replacement Table—Continued

Name, Model and Tonnage	ENGINE								BRAKE LINING						FRAME					
	Piston Rings	Carburetor	Upper Hose	Lower Hose	Fan Belt		Service			Emergency			Length	Width	Length		Width		Length	
	No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Type	Length	Width	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces	Back of Driver's Seat	Over All
G.M.C. K-41	4	1/4	1 1/8	V	10 1/8	1 1/4	9 1/2	1 1/4	37 7/8	F	13	3 1/2	1/4	4	13	3 1/2	1/4	4	Opt	33
G.M.C. K-71	4	1/4	1 1/8	V	11 1/4	1 1/4	9 1/2	1 1/4	37 7/8	F	15 1/2	3 3/4	1/4	4	15 1/2	3 3/4	1/4	4	Opt	38
G.M.C. K-101	4	1/4	1 1/8	V	11 1/4	1 1/4	9 1/2	1 1/4	37 7/8	F	17 3/4	4	1/4	4	17 3/4	4	1/4	4	Opt	34
Gove A-1-2 1/2	3	1/4	1/4	V	5	2	4	1 1/4	64	F	54 1/2	2 1/2	1 1/8	2	21	2 1/2	1 1/8	2	119 1/2	33
Graham A.	3	1	1 1/2	V	5	2	4	1 1/4	64	F	21	2 1/2	1 1/8	2	21	2 1/2	1 1/8	2	140 1/4	33
Gramm-Bernstein 10 Speed—1921	3	1	1 1/2	H	5	2	4	1 1/4	64	F	48 1/2	2	1 1/8	2	45 7/8	1 1/2	1 1/8	2	97	30
Gramm-Bernstein 15-1 1/2—1921	3	1	1 1/2	H	10 1/4	2	6	2	39	F	19 1/2	2	1 1/8	4	19 1/4	1 1/4	1 1/8	4	120	32
Gramm-Bernstein 65-1 1/2—1921	3	1	1 1/2	H	10 1/4	2	6	2	39	F	45	2	1 1/8	4	45	2	1 1/8	4	120	32
Gramm-Bernstein 20-2—1921	3	1/4	1 1/2	V	4 1/2	1 1/2	12	1 1/2	32	F	22 1/2	2 1/4	1/4	4	22 1/4	2 1/4	1/4	4	126	32 1/4
Gramm-Bernstein 25-2 1/2—1921	3	1/4	1 1/2	V	11	1 1/2	9	1 1/2	33 3/4	F	28 1/2	2 1/4	1/4	4	28 1/4	2 1/4	1/4	4	129 1/4	36
Gramm-Bernstein 30—1921	3	1/4	1 1/2	V	11	1 1/2	9	1 1/2	33 3/4	F	32 1/2	2 1/4	1/4	4	32 1/4	2 1/4	1/4	4	144	36
Gramm-Bernstein 35-3 1/2—1921	3	1/4	1 1/2	V	11	1 1/2	9	1 1/2	33 3/4	F	38	2	1 1/8	2	47	1 1/2	1 1/8	2	89	32
Gramm-Bernstein 50-5—1921	3	1/4	1 1/2	V	23 1/4	2	13 3/4	2	40 1/2	F	49	1 1/2	1 1/8	3	11 1/2	3	1 1/8	4	144	39
G. W. W.	3	1/4	1 1/2	V	12	1 1/2	11	1 1/2	37	F	57	2	1 1/8	2	57	2	1 1/8	2	147	38
Hall 2-Worm-2 1/2	3	1/4	1 1/2	V	8	1 1/2	12 1/2	1 1/2	32	F	69	3	1 1/8	2	69	2	1 1/8	2	147	38
Hall 3 1/2-Worm.	3	1/4	1 1/2	V	12 1/2	1 1/2	15 1/2	1 1/2	38 1/2	F	12	1 1/2	1 1/8	2	12	1 1/2	1 1/8	2	85	32
Hall 5-Worm.	3	1/4	1 1/2	V	12 1/2	1 1/2	15 1/2	1 1/2	38 1/2	F	18	4	1 1/8	2	18	4	1 1/8	2	144	39
Hall 7-Chain	3	1/4	1 1/2	V	12 1/2	1 1/2	15 1/2	1 1/2	38 1/2	F	24	2	1 1/8	1	46	3 1/2	1 1/8	2	120	30
Hendrickson 1-2 1/2	3	1/4	1 1/2	V	11	1 1/2	9	1 1/2	33 3/4	F	32 1/2	2 1/4	1/4	2	44	2 1/4	1 1/8	2	123	32
Hendrickson J-3 1/2	3	1/4	1 1/2	V	11	1 1/2	9	1 1/2	33 3/4	F	38	2	1 1/8	2	44	2 1/4	1 1/8	2	147	38
Hendrickson K-5	3	1/4	1 1/2	V	11	1 1/2	9	1 1/2	33 3/4	F	46	2 1/2	1 1/8	2	44	2 1/4	1 1/8	2	132	35 1/2
Highway Knight A.	3	1/4	1 1/2	V	14	2 1/2	10	2 1/2	53	F	51	2	1 1/8	2	44	2 1/4	1 1/8	2	126	33
Highway Knight B-5.	3	1/4	1 1/2	V	14	2 1/2	10	2 1/2	53	F	56	2	1 1/8	2	51	2 1/4	1 1/8	2	138	33
Higrade A18-1—1918-19	3	1/4	1 1/2	V	9	2	7	2	32	R	18	2	1 1/8	2	56	2 1/4	1 1/8	2	144	34
Higrade B20-1 1/2—1919-20	3	1/4	1 1/2	V	9	2	7	2	32	R	24	2	1 1/8	2	50	2 1/4	1 1/8	2	121	33
Holmes 4 WD-2	3	1/2	1 1/2	V	11	1 1/2	9	1 1/2	33 3/4	F	30	2	1 1/8	2	36	2 1/4	1 1/8	2	145	33
Huffman B-1 1/2—1919-20.	3	1/2	1 1/2	V	11	1 1/2	9	1 1/2	33 3/4	F	38	2	1 1/8	2	43 1/2	2 1/4	1 1/8	2	108	32
Huffman C-1 1/2—1919-20.	3	1/2	1 1/2	V	11	1 1/2	9	1 1/2	33 3/4	F	43 1/2	2	1 1/8	2	43 1/2	2 1/4	1 1/8	2	88 1/2	34
Hurlburt A1 1/2-2	3	1/4	1	V	6	1 1/4	13	1 1/4	26 5/8	F	51	2 1/4	1/4	2	51	2 1/4	1/4	2	144 1/2	34
Hurlburt B2 1/2	3	1/4	1	V	6	1 1/4	13	1 1/4	26 5/8	F	56	2 1/4	1/4	2	56	2 1/4	1/4	2	144 1/2	34
Hurlburt C3 1/2-4	3	1/4	1	V	6	1 1/4	13	1 1/4	26 5/8	F	68	3	1 1/8	2	68	3	1 1/8	2	156	34
Hurlburt D5-5 1/2	3	1/4	1	V	6	1 1/4	13	1 1/4	26 5/8	F	73 1/2	2 1/4	1/4	2	73 1/2	2 1/4	1/4	2	147 1/2	34
Huron-Erie 1 1/2	4	1/4	1 1/2	V	10	1 1/2	17 1/2	1 1/2	26 5/8	F	50	2 1/2	1/4	1	50	2 1/2	1/4	1	150	36
Huron-Michigan 2 1/2	4	1/4	1 1/2	V	9 1/4	2 1/4	17 1/2	2 1/4	30 1/2	F	58 1/2	3 1/2	1/4	2	47	1 1/2	1 1/8	2	120	32
Indiana 12-1 1/2—1921	3	1/4	1	V	17	1 1/4	14	1 1/4	38 1/2	F	48 1/2	2	1 1/8	2	48	1 1/2	1 1/8	2	116	34
Indiana 20-2—1921	3	1/4	1	V	6	1 1/4	13	1 1/4	26 5/8	F	49	2	1 1/8	2	49	1 1/2	1 1/8	2	116	34
Indiana 25-2 1/2—1921	3	1/4	1	V	6	1 1/4	13	1 1/4	26 5/8	F	51	2 1/4	1/4	2	51	2 1/4	1/4	2	144	33
Indiana 35-3 1/2—1921	3	1/4	1	V	6	1 1/4	13	1 1/4	26 5/8	F	56	2 1/4	1/4	2	56	2 1/4	1/4	2	144	34
Indiana 51-5—1921	3	1/4	1	V	10	1 1/4	17 1/2	1 1/2	26 5/8	F	68	3	1 1/8	2	68	3	1 1/8	2	156	34
International S-1500 lbs.—Speed Truck '21	3	1/4	1	V	9 1/4	2 1/4	17 1/2	2 1/4	30 1/2	F	38	2	1 1/8	2	36	2 1/4	1 1/8	2	90	34
International 21-2000 lbs.—1916-21.	3	1/4	1	V	6	1 1/4	13	1 1/4	26 5/8	F	43 1/2	2 1/4	1/4	2	43 1/2	2 1/4	1/4	2	118 1/4	34
International 31-3000 lbs.—1916-21.	3	1/4	1	V	6	1 1/4	13	1 1/4	26 5/8	F	43 1/2	2 1/4	1/4	2	50 1/2	2 1/4	1/4	2	144	34
International 41-4000 lbs.—1918-21.	3	1/4	1	V	6	1 1/4	13	1 1/4	26 5/8	F	50 1/2	2 1/4	1/4	2	50 1/2	2 1/4	1/4	2	147 1/2	34
International 61-6000 lbs.—1918-21.	4	1/4	1	V	9	2 1/4	14 1/2	2	38 1/2	F	60 1/2	3	1 1/8	2	60 1/2	3	1 1/8	2	147 1/2	34
International 101-10,000 lbs.—1920-21	4	1/4	1	V	9	2 1/4	14 1/2	2	38 1/2	F	73 1/2	2 1/4	1/4	2	73 1/2	2 1/4	1/4	2	147 1/2	34
Jackson B 3 1/2	3	1/4	1 1/2	V	11	1 1/2	18	1 1/2	32 1/2	F	58 1/2	3 1/2	1/4	2	47	1 1/2	1 1/8	2	120	32
Jumbo 15-1 1/2—1919.	4	1/4	1	V	12 1/2	1 1/2	18	1 1/2	33 3/8	F	48 1/2	2	1 1/8	2	47	1 1/2	1 1/8	2	120	32
Jumbo 20-2—1919.	4	1/4	1	V	12 1/2	1 1/2	18	1 1/2	33 3/8	F	49 1/2	2	1 1/8	2	47	1 1/2	1 1/8	2	116	34
Jumbo 25-2 1/2—1917-19.	3	1/4	1	V	12	2	10	1 1/4	33 3/8	F	49 1/2	3	1 1/8	2	47 1/2	2 1/2	1 1/8	2	116	34
Jumbo 30-3—1917-19.	3	1/4	1	V	12	2	10	1 1/4	33 3/8	F	49 1/2	3	1 1/8	2	47 1/2	2 1/2	1 1/8	2	116	34
Jumbo 35-3 1/2—1919.	4	1/4	1	V	17 1/2	2	21 1/2	1 1/4	36 1/2	F	60 1/2	3	1 1/8	2	58 1/2	2 1/2	1 1/8	2	144	36
Jumbo 40-4—1919.	4	1/4	1	V	17 1/2	2	21 1/2	1 1/4	36 1/2	F	60 1/2	3	1 1/8	2	58 1/2	2 1/2	1 1/8	2	144	36
Kalamazoo G-2 1/2	3	1/4	1	V	20 1/2	1 1/2	19 1/2	1 1/2	40	F	50	2 1/2	1 1/8	1	50	2 1/2	1 1/8	1	120	32 1/2
Kalamazoo H-2 1/2	3	1/4	1	V	20	1 1/														

Replacement Table—Continued

Name, Model and Tonnage	ENGINE								BRAKE LINING						FRAME		
	Piston Rings	Carburetor	Upper Hose		Lower Hose		Fan Belt		Service			Emergency			Length	Width	
			No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Type	Length	Width	No. of Pieces	Thickness	
MacDonald A-7½	4	1½	V	12	2	21	1½	35	2	F	70	3	1	34	1	1	
Mack AB1½, 2, 2½-Ton-Chain	4	1½	9½	1½	4½	9½	1½	33	1½	F	12½	4	2	16½	2½	Opt	
Mack Dual Reduction, 1½, 2, 2½-1921	4	1½	9½	1½	4½	9½	1½	33	1½	F	18½	3½	4	12	6	Opt	
Mack AB-Tractor 5 Ton—16-20	4	1½	9½	1½	4½	9½	1½	33	1½	F	12½	4	2	16½	2½	77	
Mack AC 3½ to 7½ ton—16-20	4	1½	5½	2½	4½	1½	1½	—	1	V	16½	3	4	20½	3½	Opt	
Mack AC Trac. 7 to 15 Ton—16-20	4	1½	5½	2½	4½	1½	1½	—	1	V	16½	3	4	20½	3½	37½	
Master JI-1½—1919-20	3	1½	5½	2½	4½	1½	1½	—	1	V	16½	3	4	20½	3½	87	
Master JW-1½—1919-21	3	1½	12½	2	12½	1½	1½	30½	1	F	7½	2½	1	74½	2½	117½	
Master M-2½—1916-20	3	1½	13½	2	12½	1½	1½	30½	1	F	7½	2½	1	74½	2½	117½	
Master O 2½—1917-20	3	1½	13½	2	12½	1½	1½	33	1½	F	7½	2½	1	74½	2½	156½	
Master W-2½—1916-21	3	1½	13½	2	12½	1½	1½	33	1½	F	13½	3½	2	13½	3½	117½	
Master WL 2½—1917-21	3	1½	13½	2	12½	1½	1½	31	1½	F	13½	3½	2	13½	3½	156½	
Master D-2½—1920-21	3	1½	13½	2	12½	1½	1½	31	1½	F	13½	3½	2	13½	3½	117½	
Master DL 2½—1920-21	3	1½	13½	2	12½	1½	1½	31	1½	F	13½	3½	2	13½	3½	156½	
Master T-6 Tractor—1917-21	3	1½	13½	2	12½	1½	1½	33	1½	F	7½	2½	1	74½	2½	72½	
Master A-3½—1918-21	4	1½	13½	2	12½	1½	1½	33	1½	F	12½	3½	2	12	3½	147½	
Master AL-3½—1918-21	4	1½	13½	2	12½	1½	1½	33	1½	F	16	3½	2	16	3½	183½	
Master E-3½—1920-21	4	1½	13½	2	12½	1½	1½	33	1½	F	11	6	2	25	4	147½	
Master EI-3½—1920-21	4	1½	13½	2	12½	1½	1½	33	1½	F	11	6	2	25	4	183½	
Master B-5—1919-21	4	1½	13½	2	12½	1½	1½	35	2	F	18	4	2	18	4	162½	
Master BL 5—1919-21	4	1½	13½	2	12½	1½	1½	35	2	F	11	6	2	25	4	186½	
Master F-5—1920-21	4	1½	13½	2	12½	1½	1½	35	2	F	11	6	2	25	4	102	
Master FL 5—1920-21	4	1½	13½	2	12½	1½	1½	35	2	F	11	6	2	25	4	102	
Maxwell 1½—1917-20	3	1	1	1	1	1	1	—	1	—	16	1½	4	4	1½	32	
Menominee HT-1—1918-20	3	1	1	1	1	1	1	—	1	—	12	3½	2	2	122	32	
Menominee H-1½—1916-20	3	1	1	1	1	1	1	—	1	—	13½	3½	2	2	146	32	
Menominee D-2—1915-20	3	1	1	1	1	1	1	—	1	—	13½	3½	2	2	149	36	
Menominee G-3½—1916-20	3	1	1	1	1	1	1	—	1	—	16	3½	2	2	149	38	
Menominee J-5—1917-20	3	1	1	1	1	1	1	—	1	—	18½	4	2	2	108	32	
Menominee Ht-1—1920-late	3	1	1	1	1	1	1	9½	1½	10½	1½	33½	2½	2	33½	2½	102½
Menominee H-1—1920-late	3	1	1	1	1	1	1	9½	1½	10½	1½	33½	2½	2	33½	2½	124
Menominee D-2—1920-late	3	1	1	1	1	1	1	9	2	19	1½	37½	2	2	42½	2½	131½
Menominee G-3½—1920-late	3	1	1	1	1	1	1	9	2	19	1½	37½	2	2	42½	2½	149
Menominee J-5—1920-late	3	1	1	1	1	1	1	9	2	19	1½	40½	2	2	52	2½	149
Moline	3	1	1	1	1	1	1	10½	2½	4½	4½	2	2	20	2	2	108
Moreland 21B-1½—1919-20-21	3	1	1	1	1	1	1	9	1½	13½	1½	42	1½	2	3½	2½	132
Moreland 21C-2½—1919-20-21	3	1	1	1	1	1	1	9	1½	13½	1½	42	1½	2	3½	2½	156
Moreland 21H-4—1919-20-21	3	1	1	1	1	1	1	9	2	19	2	42	2	2	42	2½	168
Moreland 21J-5—1919-20-21	3	1	1	1	1	1	1	9	2	19	2	42	2	2	42	2½	168
Mutual 2B—1919-20	3	1	1	1	1	1	1	19	1½	17	1½	37½	2	2	51	2½	128½
Mutual 2BP—1919-20	3	1	1	1	1	1	1	19	1½	17	1½	37½	2	2	51	2½	128½
Napoleon 9-1—1919-20	3	1	1	1	1	1	1	6	2½	12	2	36	1	2	30	2	101
Napoleon 11-1½—1919-20	3	1	1	1	1	1	1	6	2½	12	2	36	1	2	30	2	101
Nash 2018-1—1919-20	4	1½	1½	3	1½	7½	1½	—	44	1	F	49½	2½	2	20½	2½	104½
Nash 3018-2—1919-20	4	1½	1½	3	1½	7½	1½	—	44	1	F	49½	2½	2	20½	2½	118½
Nash 4017-2—1919-20	3	1	1	1	1	1	1	7	1½	—	44	2	2	12	2	117½	
Nelson & LeMoore F1	3	1	1	1	1	1	1	—	—	—	12	3½	2	2	140	34	
Nelson & LeMoore F1½	3	1	1	1	1	1	1	—	—	—	12	3½	2	2	140	34	
Nelson & LeMoore F2	3	1	1	1	1	1	1	—	—	—	12	3½	2	2	140	34	
Nelson & LeMoore F3½	3	1	1	1	1	1	1	—	—	—	12	3½	2	2	140	34	
Nelson & LeMoore F5	3	1	1	1	1	1	1	—	—	—	18	4	2	2	140	34	
Netco D-2½	3	1	1	1	1	1	1	6½	1½	13½	1½	28½	1½	2	3½	2½	34½
Netco H-2½	3	1	1	1	1	1	1	9	1½	16	1½	30½	2	2	13½	2½	34½
Niles E-2	3	1	1	1	1	1	1	8	1½	11	1½	30	2	2	12	2	147
Noble B30-1½—1918-20	3	1	1	1	1	1	1	16½	1½	7	1½	34½	1½	2	2	136	
Noble C40-2—1919-20	4	1	1	1	1	1	1	12	1½	9	2	34½	1½	2	2	148	
Noble D50-2½—1919-20	4	1	1	1	1	1	1	16	1½	14½	2	34½	1½	2	2	172	
Noble E70-3½—1919-20	4	1	1	1	1	1	1	16	1½	14½	2	34½	1½	2	2	172	
Northway B-2	3	1	1	1	1	1	1	9	2	19	2	42	2	2	18	2	118
Northway B-3	3	1	1	1	1	1	1	9	2	19	2	42	2	2	18	2	133
Northway 25E-1	3	1	1	1	1	1	1	9	2	19	2	42	2	2	18	2	100
Northway 35E-1½	3	1	1	1	1	1	1	9	2	19	2	42	2	2	18	2	124
Northway 35E-1½ Spec. 1½	3	1	1	1	1	1	1	11	2	18	1½	36	2	2	19	2	124
Ogden D-1½	1	1	1	1	1	1	1	13	2	12	2	30	1½	2	3½	2½	144
Ogden E-2½	1	1	1	1	1	1	1	10	1½	14	1½	30	1½	2	3½	2½	168
Ogden F-3½	1	1	1	1	1	1	1	11	1½	16	1½	36	1½	2	3½	2½	168
Ogden G-5	1	1	1	1	1	1	1	9	2	18	2	40	2	2	12	2	34
O. K. 1½—1920	4	1	1	1	1	1	1	12	2	13½	1½	36	2	2	12	2	117
O. K. 2½—1920	4	1	1	1	1	1	1	12	2	13½	1½	36	2	2	12	2	135
O. K. 3½—1920	4	1	1	1	1	1	1	12	2	13½	1½	38	2	2	12	2	134
Old Hickory W-1—1919	3	1	1	1	1	1	1	7	2	11½	2	37½	½	2	1	1	32
Old Reliable A-1½—1918-20-21	3	1	1	1	1	1	1	—	—	—	24	48	1	1	48	1	105
Old Reliable B-2½—1918-20-21	3	1	1	1	1	1	1	—	—	—	54	2	1	54	2	144	
Old Reliable C-3½—1918-20-21	3	1	1	1	1	1	1	—	—	—	60	2½	1	60</			

THE COMMERCIAL CAR JOURNAL

Replacement Table—Continued

Name, Model and Tonnage	ENGINE						BRAKE LINING						FRAME			
	Piston Rings	Carburetor	Upper Hose	Lower Hose	Fan Belt	Type	Service		Emergency		Length	Width	Length	Width		
	No. per Cyl.	Width	Length	Width	Length		Length	Width	No. of Pieces	Length	Width	Thickness				
Rainier R-6-1½	3	1 1/2	V	9 1/2	1 1/2	14 1/2	1 1/2	41	1 1/2	F	19	2	19	2	113	34
Rainier R-19-1	3	1 1/2	V	8 1/2	1 1/2	14	1 1/2	41	1 1/2	F	19	2	19	2	100	34
Rainier R-11-½	3	1 1/2	V	9	1 1/2	14 1/2	1 1/2	42	1 1/2	F	11 1/2	3	11 1/2	3	90	34
Ranger TK-20-2	3	1 1/2	H	11 1/2	1 1/2	10	1 1/2	33 1/2	1	F	11 1/2	3	11 1/2	3	106 1/2	33
Reliance 10A-1½—1920-21	4	1 1/2	V	10 1/2	2	13 1/2	1 1/2	35	2	F	17	2	17	2	122	32
Reliance 20B-2½—1920-21	4	1 1/2	V	10 1/2	2	13 1/2	1 1/2	35	2	F	17	2	17	2	127	32
Reo F-1500-2500-lbs	3	1 1/2	V	5 1/2	1	5 1/2	1	39 1/2	7/8	F	43	2 1/4	39 1/2	2 1/4	82	30
Republi 10-1-10E-1—1919-20-21	3	1 1/2	V	12 1/2	2	6	2	40 1/2	1 1/4	F	21 1/4	2 1/4	19 1/2	2 1/4	34	34
Republi 11X-1½—1919-20-21	3	1 1/2	V	12 1/2	2	6	2	40 1/2	1 1/4	F	25 1/2	2 1/4	24 1/2	2 1/4	118	34
Republi 19-2 1/2—1919-20-21	3	1 1/2	V	8	1 1/2	11 1/2	1 1/2	32 1/2	1 1/4	F	25 1/2	2 1/4	24 1/2	2 1/4	121	34
Republi 20-3 1/2—1919-20-21	3	1 1/2	V	7 1/2	2 1/2	5 1/2	1 1/2	36 1/2	1 1/2	F	55 1/2	3 1/2	50 1/2	4 1/2	146	37
Republi 75 1/2—1921	3	1 1/2	V	12	2 1/2	18 1/2	2 1/2	31 1/2	1	F	19	2	18	2	95	31
Reynolds 3A-1½	3	1 1/2	V	12	2 1/2	18 1/2	2 1/2	31 1/2	1	F	46	2	46	2	121	33
Reynolds 5A-2 1/2	3	1 1/2	V	12	2 1/2	18 1/2	2 1/2	31 1/2	1	F	52 1/2	2 1/4	52 1/2	2 1/4	126	33
Reynolds 7A-3 1/2	3	1 1/2	V	12	2 1/2	18 1/2	2 1/2	31 1/2	1	F	57	2 1/2	57	2 1/2	148	37
Reynolds 10A-5	3	1 1/2	V	12	2 1/2	18 1/2	2 1/2	31 1/2	1	F	70	3	70	3	148	37
Riker B3, BB-4	5	1 1/2	V	9 1/2	1 1/2	8	1 1/4	49 1/2	1 1/4	V	7 1/4	4 1/2	20	4	150	38
Rowe CW-1 1/2—1918-19-20	3	1 1/2	V	10 1/2	1 1/2	10 1/2	1 1/2	32 1/2	1 1/2	F	19	2	19	2	113	33
Rowe CDW-2—1916-20	3	1 1/2	V	10 1/2	1 1/2	10 1/2	1 1/2	32 1/2	1 1/2	F	45	2	45	2	123	33
Rowe GS-2—1918-20	3	1 1/2	V	20	1 1/2	15 1/2	1 1/2	36 1/2	2	F	51 1/2	2 1/2	56 1/2	2 1/2	140	36
Rowe FW-5—1914-20	3	1 1/2	V	20	1 1/2	15 1/2	1 1/2	36 1/2	2	F	68	3	68	3	153	38
Rowe GPW-3—1916-17, 1919-20	3	1 1/2	V	10	1 1/2	6	1 1/4	39 1/2	1 1/4	V	7 1/4	4 1/2	20	4	152	33
Rumley A-1 1/2	4	1 1/2	V	10 1/2	1 1/2	10 1/2	1 1/2	37	2	F	18	2	18	2	122	34
Samson 15 1/2	2	1 1/2	V	6 1/2	1 1/2	7 1/2	1 1/4	37 1/2	1 1/4	V	34 1/2	1 1/2	37 1/2	1 1/2	108 1/2	39 1/2
Samson 25-1 1/2	3	1 1/2	V	6 1/2	1 1/2	7 1/2	1 1/4	37 1/2	1 1/4	V	43 1/2	1 1/2	43 1/2	1 1/2	96	34
Sandow G-1—1918-20	3	1 1/2	V	12	2	12	2	41	1 1/4	F	20	2	20	2	120	34
Sandow CG-1 1/2—1918-20	3	1 1/2	V	12	2	12	2	41	1 1/4	F	60	3	60	3	132	32
Sandow I-2—1918-20	3	1 1/2	V	12	2	12	2	41	1 1/4	F	13 1/2	3 1/2	16	3 1/2	144	32
Sandow J-2 1/2—1918-20	3	1 1/2	V	12	2	12	2	41	1 1/4	F	24	4 1/2	24	4 1/2	144	37
Sandow L-5—1918-20	3	1 1/2	V	12	2	12	2	41	1 1/4	F	18 1/2	4	18 1/2	4	144	37
Sanford 25 2 1/2—1917-20	3	1 1/2	V	12	2	12	2	41	1 1/4	F	51 1/2	2 1/2	51 1/2	2 1/2	144	35
Sanford W-35 2 1/2—1917-20	3	1 1/2	V	12	2	12	2	41	1 1/4	F	69	3	69	3	145	35
Sanford W-50-5—1917-20	3	1 1/2	V	12	2	12	2	41	1 1/4	F	8 1/2	3 1/2	8 1/2	3 1/2	140	35
Schacht 2	3	1 1/2	V	12	2	12	2	41	1 1/4	F	8 1/2	3 1/2	8 1/2	3 1/2	140	35
Schacht 2 1/2	3	1 1/2	V	12	2	12	2	41	1 1/4	F	12	3 1/2	12	3 1/2	152	35
Schacht 3 1/2	4	1 1/2	V	12	2	12	2	41	1 1/4	F	12	3 1/2	12	3 1/2	152	35
Schacht 5	4	1 1/2	V	12	2	12	2	41	1 1/4	F	12	3 1/2	12	3 1/2	152	35
Schwartz A-1 1/2—1921	3	1 1/2	V	9 1/2	2 1/2	13	2 1/2	29 1/2	7/8	F	19 1/2	1 1/4	19 1/2	1 1/4	Opt	34
Schwartz BW-1 1/2	4	1 1/2	V	10	2	18	2	33 1/2	2	F	19	2	19	2	120	34
Schwartz CWS-CW-CWL-2 1/2	4	1 1/2	V	10 1/2	2	15	1 1/2	33 1/2	2	F	48	2 1/4	48	2 1/4	36	36
Schwartz DWS-DW-DWL-5	4	1 1/2	V	12 1/2	2	17	1 1/2	38 1/2	2	F	69 1/2	3	69 1/2	3	114	34
Selden 2 1/2A—1919-20	3	1 1/2	V	12	2	12	2	41	1 1/4	F	11 1/2	3 1/2	11 1/2	3 1/2	134	34
Selden 2 1/2A—1920	3	1 1/2	V	9	1 1/2	5 1/2	1 1/4	34 1/2	1 1/2	F	13 1/2	3 1/2	13 1/2	3 1/2	153	37
Selden 3 1/2A—1919-20	3	1 1/2	V	7	2	20 1/2	2	40 1/2	2	F	18	4	18	4	153	37
Selden 5A—1920	3	1 1/2	V	10	1 1/2	2	1 1/4	35	2	F	19 1/2	1 1/4	19 1/2	1 1/4	101 1/2	37
Service 15-1921-3	3	1 1/2	V	10	1 1/2	6	1 1/4	37 1/2	1 1/4	F	12	3 1/2	12	3 1/2	109 1/2	34
Service 220-1—1919-20	3	1 1/2	V	10	2	8	1 1/4	33	1 1/4	F	12	3 1/2	12	3 1/2	121	34
Service 31 1/2—1919-20	4	1 1/2	V	10	2	8	1 1/4	33	1 1/4	F	12	3 1/2	12	3 1/2	121	34
Service 36 1/2—1919-20	4	1 1/2	V	10	2	8	1 1/4	33	1 1/4	F	13 1/2	3 1/2	13 1/2	3 1/2	121	34
Service 51 2 1/2—1919-20	4	1 1/2	V	10	2	8	1 1/4	33	1 1/4	F	16	3 1/2	16	3 1/2	150 1/2	38
Service 71 3 1/2—1919-20	4	1 1/2	V	10	2	8	1 1/4	33	1 1/4	F	16	3 1/2	16	3 1/2	145 1/2	38
Service 76 3 1/2—1919-20	4	1 1/2	V	10	2	10	1 1/4	38 1/2	1 1/2	F	18 1/2	1 1/4	18 1/2	1 1/4	145 1/2	38
Service 101-5—1919-20	4	1 1/2	V	10	2	10	1 1/4	38 1/2	1 1/2	F	11	3	11	3	120	34
Signal NF-1	4	1 1/2	V	10	2	12	2 1/2	33 1/2	1 1/2	F	12	3 1/2	12	3 1/2	126	34
Signal H 1 1/2	3	1 1/2	V	10	2	12	2 1/2	33 1/2	1 1/2	F	13 1/2	3 1/2	13 1/2	3 1/2	126	38
Signal J-2 1/2	3	1 1/2	V	10	2	12	2 1/2	33 1/2	1 1/2	F	16	3 1/2	16	3 1/2	168	38
Signal M 3 1/2	3	1 1/2	V	10	2	12	2 1/2	33 1/2	1 1/2	F	18	4	18	4	172	38
Signal R-5	6	1 1/2	V	10	2	12	2 1/2	33 1/2	1 1/2	F	10 1/2	3	10 1/2	3	120	32
Standard I-K-2 1/2	3	1 1/2	V	12	2	12	2 1/2	33 1/2	1 1/2	F	15 1/2	3 1/2	15 1/2	3 1/2	144	38
Standard 66-3 1/2-4	3	1 1/2	V	12	2	12	2 1/2	33 1/2	1 1/2	F	17 1/2	4	17 1/2	4	144	38
Standard K-5-7	3	1 1/2	V	8	2	20 1/2	2 1/2	32 1/2	2	F	11 1/2	3 1/2	11 1/2	3 1/2	120	33
Sterling 1 1/2—1920-21	3	1 1/2	V	11	1 1/2	19	1 1/2	32 1/2	1 1/2	F	13 1/2	3 1/2	13 1/2	3 1/2	138	34
Sterling 2—1920-21	3	1 1/2	V	11	1 1/2	19	1 1/2	32 1/2	1 1/2	F	13 1/2	3 1/2	13 1/2	3 1/2	138	34
Sterling 2 1/2—1920-21	3	1 1/2	V	11	1 1/2	19	1 1/2	32 1/2	1 1/2	F	13 1/2	3 1/2	13 1/2	3 1/2	138	34
Sterling 5-Worm—1920-21	3	1 1/2	V	11	1 1/2	19	1 1/2	40	1 1/2	F	17 1/2	4	17 1/2	4	158	38
Sterling 5-																

Replacement Table—Continued

Name, Model and Tonnage	ENGINE										BRAKE LINING					FRAME		
	Piston Rings	Carburetor			Upper Hose	Lower Hose	Fan Belt			Service		Emergency		Length	Width	Length	Width	
		No. per Cyl.	Width	Outlet Diameter	Inlet Diameter	Vertical or Horizontal	Length	Width	Length	Width	Type	Length	Thickness	No. of Pieces	Length	Width	Thickness	No. of Pieces
Transport 50-2½—1920	3	1	1½	1	V	9½	2	10	1½	32½	2	10½	3½	4	48½	2½	2	123
Transport 70-3½	4	1	1½	1	V	12	2	16	1½	35½	2	11½	5½	58	2½	2	150	
Traylor B-1½—1919-20	4	1	1	1	V	11	2	16	1	38	2	12	50	2	2	117		
Traylor C-2	4	1	1½	1	V	12	2	16	1	36	2	12	50	2	2	122		
Traylor D-3	4	1	1½	1	V	12	2	16	1	36	2	12	50	2	2	142		
Traylor E-4	4	1	1½	1	V	12	2	16	1	37	2	12	50	2	2	165		
Traylor F-5	4	1	1½	1	V	12	2	16	1	37	2	12	50	2	2	165		
Triangle AA-½—1920	3	1	1	1	H	17	3	17	3	34	1	12	4½	1	2	94		
Triangle A-1½—1919-20	3	1	1	1	V	18	1½	18	1½	39½	1½	12	4½	1	2	126		
Triangle C-2—1920	3	1	1½	1	V	14	1½	14½	1½	39½	1½	12	4½	1	2	129		
Triumph HB-2½	4	1	1	1	V	9	1½	17	1½	32½	2	12	32	2	2	34		
Triumph HC-2	4	1	1	1	V	9	1½	17	1½	32½	2	12	32	2	2	34		
Twin City 2	3	1	2	2	V	11	2	13	1½	36½	2	12	48	2	2	33		
Twin City 3½	4	1	2	2	V	8	1½	4	1½	36½	2	12	3½	4	4	36		
Ultimate A-2—1920	4	1	1½	1	V	11	2	8	1½	34	2	12	45	2	2	126		
Ultimate AJ-2—1920	4	1	1½	1	V	11	2	8	1½	34	2	12	45	2	2	32		
Ultimate B-3—1920	4	1	1½	1	V	11	2	8	1½	34	2	12	45	2	2	150		
Ultimate BL-3—1920	4	1	1½	1	V	11	2	8	1½	34	2	12	45	2	2	144		
Union F-2½	3	1	1½	1	V	20	1	19½	1½	37½	2	12	55	3	1	133½		
Union HW-2½	3	1	1½	1	V	20	1	19½	1½	37½	2	12	55	3	1	133½		
Union H-4	3	1	1½	1	V	20	1	19½	1½	37½	2	12	55	3	1	157½		
Union HW-4	3	1	1½	1	V	20	1	19½	1½	37½	2	12	55	3	1	157½		
Union JW-6	3	1	1½	1	V	20	1	19½	1½	41½	2	12	34	4	2	190		
United 1½	3	1	1	1	V	15	2½	16	1½	37½	2	12	48	2	1	120		
United 2½	3	1	1	1	V	7	2½	12	1½	37½	2	12	55	3	1	Opt		
United 3½	3	1	1	1	V	7	2½	12	1½	37½	2	12	55	3	1	Opt		
United 5	3	1	1	1	V	14½	2½	12	1½	37½	2	12	55	3	1	34		
U.S.N.-1½	3	1	1	1	H	11½	2	9	1½	37	1	12	88½	2	1	120		
U.S.R.-2½-3	3	1	1	1	V	10	1½	9	1½	35	1	12	46	2	2	144		
U.S.S.-3½-4	3	1	1	1	V	9	1½	8	1½	37	1	12	50	2	2	156		
U.S.T.-5-6	3	1	1	1	V	15	2	13	1½	38½	2	12	54	3	1	36		
Velie 46-1½—1921	3	1	1	1	V	9½	2½	12½	1½	40	1	12	52½	2	1	92		
Vim 29-1½	3	1	1	1	V	20	1	19½	1½	30½	1	12	48	2	2	31		
Vim 30-2½	3	1	1	1	V	15	2	13	1½	30½	1	12	48	2	2	64		
Vim 31-1	3	1	1	1	V	9½	2½	12½	1½	40	1	12	48	2	2	4		
Vim 22-2	3	1	1	1	V	40	1	1	1	42½	2	12	48½	2	2	120%		
Vim 23-3	3	1	1	1	V	40	1	1	1	42½	2	12	48½	2	2	34		
Walker M½	5	1	1	1	V	1	1	1	1	43	1	12	57	2	1	90		
Walker K1	1	1	1	1	V	1	1	1	1	43	1	12	57	2	1	32		
Walker L2	1	1	1	1	V	1	1	1	1	43	1	12	57	2	1	32		
Walker P3½	1	1	1	1	V	1	1	1	1	43	1	12	57	2	1	40		
Walker N½	1	1	1	1	V	1	1	1	1	43	1	12	57	2	1	35		
Walker-Johnson B2½	1	1	1	1	V	1	1	1	1	43	1	12	57	2	1	133		
Walter S-5	4	1	1	2	V	10	1½	18	1½	39	1	12	5	2	1	36		
Ward LaFrance 2B-2½-3—1920	3	1	1½	1	V	7	1½	16	1½	41½	1	12	13½	4	4	137½		
Ward LaFrance 4A-3½-4—1920	3	1	1½	1	V	8½	1½	18	1½	41½	1	12	15½	4	4	170		
Ward LaFrance 5A-5-6—1920	3	1	1½	1	V	9½	1½	18	1½	41½	1	12	18	4	4	37		
Ward WS2	1	1	1	1	V	1	1	1	1	41	1	12	18	2	1	86		
Ward WA	1	1	1	1	V	1	1	1	1	41	1	12	18	2	1	33		
Ward WB	1	1	1	1	V	1	1	1	1	41	1	12	18	2	1	120		
Ward WD	1	1	1	1	V	1	1	1	1	41	1	12	18	2	1	33		
Ward WH	1	1	1	1	V	1	1	1	1	41	1	12	18	2	1	168		
Watson B1	4	1	1	1	V	16½	1½	4	1½	40	1	12	41	2	1	30		
Watson N-3½	3	1	1½	1	V	16½	1½	3	1½	34	1	12	55	3	1	147		
Watson U-5	3	1	1½	1	V	16½	1½	3	1½	38½	1	12	41	2	1	36		
White 15½	3	1	1	1	V	1	1	1	1	41	1	12	48	2	1	85½		
White 20-2	3	1	1	1	V	1	1	1	1	41	1	12	48	2	1	34		
White 40-3	3	1	1	1	V	1	1	1	1	40	1	12	48	2	1	157		
White 45-5	3	1	1	1	V	1	1	1	1	40	1	12	48	2	1	42		
White Hickory H-1½—1919	3	1	1	1	V	11	2	8	1½	41	½	12	13½	3½	4	116½		
White Hickory H-1½—1920	3	1	1	1	V	11	2	8	1½	41	½	12	13½	3½	4	116½		
White Hickory E-1—1920	3	1	1	1	V	11	2	8	1½	41	½	12	13½	3½	4	92½		
White Hickory K-2½—1920	3	1	1	1	V	9	1½	12	1½	33½	1	12	13½	3½	4	150		
Wichita K-1—1915-20-21	3	1	1½	1	V	18½	1½	12	1½	52½	1	12	49	2	1	32		
Wichita L-1½—1915-20-21	3	1	1½	1	V	18½	1½	12	1½	52½	1	12	49	2	1	30		
Wichita M-2—1915-20-21	3	1	1½	1	V	18½	1½	12	1½	52½	1	12	49	2	1	27½		
Wichita R-2½—1915-20-21	3	1	1½	1	V	18½	1½	12	1½	52½	1	12	49	2	1	26½		
Wichita RX-2½—1915-20-21	4	1	1½	1	V	5	1½	11	1½	40	1	12	54	3	1	30		
Wichita O-3½—1915-20-21	4	1	1½	1	V	5	1½	11	1½	40	1	12	54	3	1	152½		
Wichita S-5—1919-20-21	4	1	1½	1	V	5	1½	11	1½	40	1	12	66	3	1	36		
Wilcox AA-1—1920	3	1	1	1	V	1	1	1	1	47½	2	12	33½	2	2	96		
Wilcox B-1½—1920	3	1	1	1	V	1	1	1	1	47½	2	12	33½	2	2	96		
Wilcox C-2—1920	3	1	1	1	V	1	1	1	1	57½	2	12	42½	2	2	141		
Wilcox E-3½—1920	3	1	1	1	V	1	1	1	1	57½	2	12	42½	2	2	133		
Wilcox F-5—1920	3	1	1	1	V	1	1	1	1	59½	2	12	52	3	1	148½		
Wilson 1½—1919-20	4	1	1	1	V	1	1	1	1	39½	1	12	39½	1	1	120		
Wilson 2½—1919-20	4	1	1	1	V	1	1	1	1	39½	1	12	39½	1	1	120		
Wilson 3½—1919-20	4	1	1	1	V	1	1	1	1	39½	1	12	39½	1	1	120		
Winther 751-1	3	1	1	1	H	15½	2	17	2	36½	1	12</						

KEY OF ABBREVIATIONS

Note: Numerals on This Page Correspond With Numerals at Head of Specification Columns on Page Following. In All Specifications—O, Own; Op or Opt, Optional		
Engines:	Flex—Flexite Beav—Beaver Cont—Continental GBS—Golden, Belknap & Gr-B—Gray-Beal [Swartz	Rock—Rockford Russ—Russel Hart—Hartford KB—Kinsler-Bennett Mech—Mechanics M-E—Merchant & Evans Nor—Norwalk Pet—Peters Sned—Sned Spic—Spicer Ster—Sterling Ther—Thermoid UM—Universal Machine UP—Universal Products
Lubrication:	FS—Force and Splash F—Force Feed S—Splash	Flex—Flexite WD—Wet Disc DD—Dry Disc Fr—Friction
Carburetor:	B&B—Ball & Ball Bent—Bennett Cart—Carter Eag—Eagle Ens—Ensign Fitch—Fletcher Holl—Holley John—Johnson King—Kingston Mar—Marvel Mas—Master Mill—Miller Rayf—Rayfield Scoe—Scoe Strm—Stromberg Shk—Shakespeare Sheb—Schebler Stew—Stewart Till—Tillotson Zen—Zenith	Flex—Flexite Hart—Hartford KB—Kinsler-Bennett Mech—Mechanics M-E—Merchant & Evans Nor—Norwalk Pet—Peters Sned—Sned Spic—Spicer Ster—Sterling Ther—Thermoid UM—Universal Machine UP—Universal Products
Valve Arrangement:	Lib—Liberty L.M.F.—Light Mfg. & Fdy. Sup—Supreme TC—Twin City Vict—Victory Wau—Waukesha Wei—Weidely Wis—Wisconsin	Flex—Flexite WD—Wet Disc DD—Dry Disc Fr—Friction
Radiator (Make):	H—Overhead I—ELL-Head T—TEE-Head S—Sleeve	Flex—Flexite WD—Wet Disc DD—Dry Disc Fr—Friction
How Cooled:	A—Air B—Pump & Thermo C—Centrifugal G—Gear Pump T—Thermo-Syphon	Flex—Flexite WD—Wet Disc DD—Dry Disc Fr—Friction
BW—B & W	Brn—Brennen Bus—Bush Can—Candler Chic—Chicago EM—English-Mersick Eur—Eureka Fed—Fedders Flex—Flexo GO—G. & O. Har—Harrison Hoo—Hooven Idl—Ideal Jam—Jamestown Kue—Kuenz Liv—Livingston Lang—Long McC—McCord Mod—Modine Per—Perfix	Flex—Flexite WD—Wet Disc DD—Dry Disc Fr—Friction
5	R—T—Rome-Turney S-W—Sparks-Withington Spec—Special Split—Splitex Stan—Standard Whee—Wheeler	Flex—Flexite WD—Wet Disc DD—Dry Disc Fr—Friction
6	7	Flex—Flexite WD—Wet Disc DD—Dry Disc Fr—Friction
12	8	Flex—Flexite WD—Wet Disc DD—Dry Disc Fr—Friction
13	9	Flex—Flexite WD—Wet Disc DD—Dry Disc Fr—Friction
14	10	Flex—Flexite WD—Wet Disc DD—Dry Disc Fr—Friction
15	11	Flex—Flexite WD—Wet Disc DD—Dry Disc Fr—Friction
16	12	Flex—Flexite WD—Wet Disc DD—Dry Disc Fr—Friction
17	13	Flex—Flexite WD—Wet Disc DD—Dry Disc Fr—Friction
18	14	Flex—Flexite WD—Wet Disc DD—Dry Disc Fr—Friction
19	15	Flex—Flexite WD—Wet Disc DD—Dry Disc Fr—Friction
20	16	Flex—Flexite WD—Wet Disc DD—Dry Disc Fr—Friction
21	17	Flex—Flexite WD—Wet Disc DD—Dry Disc Fr—Friction
22	18	Flex—Flexite WD—Wet Disc DD—Dry Disc Fr—Friction
23	19	Flex—Flexite WD—Wet Disc DD—Dry Disc Fr—Friction

Commercial Car Specifications—Corrected Monthly

The Specifications, Chassis Prices, Etc., Are Corrected Each Month From Data Supplied Direct by the Makers. Gasoline Tractor-Trucks Will be Found at the End of Gasoline Commercial Cars

See Also Replacement Table in "Service and Repair Departments." Trick Frame Dimensions Are Included in Replacement Table

An asterisk in front of the model name indicates that corrections have been made somewhere in the specifications since the previous month.

Trade Name and Model	Chassis Price	ENGINE DETAILS										GEARSET										TIRES, WHEELS, RIMS		Wheels		Chassis Weight	
		Bores and Stroke	Stroke	How Power	Horserpower	How Arrangement	Governor (Make)	Cylinder (Type)	Engines Starter	Location	Spindles	Universal (Make)	Spindles (Make)	Final Drive	Transmission Gear	Detail Gear in High	Detail Gear in Low	Section in High	Section in Low	Front	Rear	Wheels (Make)	Rim Equipment	Wheels	Chassis Weight		
2 Ton—Con'd																											
Ranger TK-20-2...	2275	Wis CAU	22.5 L	4x4	15	C	Bus Fed	PT	Spd	Full	U	3	UP	Shel	W	Tim	36x7	38x7*	36x6*	38x7*	31	29.97	Bin	Fir	3700	136.40	
Howe CDW2...	3690	Wis EAU	22.5 L	4x4	15	C	Bus Fed	PT	Spd	Full	U	3	UP	Shel	W	Tim	36x3 1/2	36x3 1/2	36x4	36x4	31	142.76	Bin	Fir	4500	142.76	
Sandow 1...	2676	Buda HU	22.5 L	4x4	15	C	Bus Fed	PT	Spd	Full	U	3	UP	Shel	W	Tim	36x3 1/2	36x3 1/2	36x4	36x4	31	142.76	Bin	Fir	4500	142.76	
Schacht...	2690	Buda HTU	22.5 L	4x4	15	C	Bus Fed	PT	Spd	Full	U	3	UP	Shel	W	Tim	36x3 1/2	36x3 1/2	36x4	36x4	31	142.76	Bin	Fir	4500	142.76	
*Southern 20...	3085	Star FU	25.6 L	4x4	15	C	Bus Fed	PT	Spd	Full	U	3	UP	Shel	W	Tim	36x3 1/2	36x3 1/2	36x4	36x4	31	156.70	Bin	Fir	5500	156.70	
*Sterling 2...	2860	Cont C2	25.6 L	4x4	15	C	Bus Fed	PT	Spd	Full	U	3	UP	Shel	W	Tim	36x3 1/2	36x3 1/2	36x4	36x4	31	156.70	Bin	Fir	6020	142.94	
*Stewart 7...	2860	For CU3	25.6 L	4x4	15	C	Bus Fed	PT	Spd	Full	U	3	UP	Shel	W	Tim	36x3 1/2	36x3 1/2	36x4	36x4	31	156.70	Bin	Fir	4460	156.72	
Stoughton D...	2860	Cont C2	25.6 L	4x4	15	C	Bus Fed	PT	Spd	Full	U	3	UP	Shel	W	Tim	36x3 1/2	36x3 1/2	36x4	36x4	31	156.70	Bin	Fir	4600	140.70	
Superior E...	2860	Cont C2	25.6 L	4x4	15	C	Bus Fed	PT	Spd	Full	U	3	UP	Shel	W	Tim	36x3 1/2	36x3 1/2	36x4	36x4	31	156.70	Bin	Fir	3600	145.75	
Traffic 4000C...	1695	Buda ITU	25.6 L	4x4	15	C	Bus Fed	PT	Spd	Full	U	3	UP	Shel	W	Tim	36x3 1/2	36x3 1/2	36x4	36x4	31	156.70	Bin	Fir	4200	147.60	
Taylor C...	2850	Buda ITU	25.6 L	4x4	15	C	Bus Fed	PT	Spd	Full	U	3	UP	Shel	W	Tim	36x3 1/2	36x3 1/2	36x4	36x4	31	156.70	Bin	Fir	4800	150.80	
Triangle C...	2700	Wau BUX	25.6 L	4x4	15	C	Bus Fed	PT	Spd	Full	U	3	UP	Shel	W	Tim	36x3 1/2	36x3 1/2	36x4	36x4	31	156.70	Bin	Fir	5100	146.80	
Twin City 2...	2750	Buda ITU	25.6 L	4x4	15	C	Bus Fed	PT	Spd	Full	U	3	UP	Shel	W	Tim	36x3 1/2	36x3 1/2	36x4	36x4	31	156.70	Bin	Fir	3200	136.80	
Ultimate A.J...	3250	Buda HTU	25.6 L	4x4	15	C	Bus Fed	PT	Spd	Full	U	3	UP	Shel	W	Tim	36x3 1/2	36x3 1/2	36x4	36x4	31	156.70	Bin	Fir	4500	156.72	
Vin 2B...	3150	Her C2	25.6 L	4x4	15	C	Bus Fed	PT	Spd	Full	U	3	UP	Shel	W	Tim	36x3 1/2	36x3 1/2	36x4	36x4	31	156.70	Bin	Fir	3800	145.75	
*Wichita M...	2850	Wau BX	25.6 L	4x4	15	C	Bus Fed	PT	Spd	Full	U	3	UP	Shel	W	Tim	36x3 1/2	36x3 1/2	36x4	36x4	31	156.70	Bin	Fir	4400	144.80	
Winter 20...	3250	Wis EAU	25.6 L	4x4	15	C	Bus Fed	PT	Spd	Full	U	3	UP	Shel	W	Tim	36x3 1/2	36x3 1/2	36x4	36x4	31	156.70	Bin	Fir	5300	156.50	
*Wisconsin (Loganville)...	1700	GBS	25.6 L	4x4	15	C	Bus Fed	PT	Spd	Full	U	3	UP	Shel	W	Tim	36x3 1/2	36x3 1/2	36x4	36x4	31	156.70	Bin	Fir	5000	144.70	
Witt Will P...	3250	Cont C4	25.6 L	4x4	15	C	Bus Fed	PT	Spd	Full	U	3	UP	Shel	W	Tim	36x3 1/2	36x3 1/2	36x4	36x4	31	156.70	Bin	Fir	3200	136.80	
Wolverine J...	2640	Cont J	25.6 L	4x4	15	C	Bus Fed	PT	Spd	Full	U	3	UP	Shel	W	Tim	36x3 1/2	36x3 1/2	36x4	36x4	31	156.70	Bin	Fir	4500	144.75	
Young 6...	3100	Cont K-4	25.6 L	4x4	15	C	Bus Fed	PT	Spd	Full	U	3	UP	Shel	W	Tim	36x3 1/2	36x3 1/2	36x4	36x4	31	156.70	Bin	Fir	4500	144.75	
2 1/2 Ton																											
*Ae 20...	Wau CU	30.6 L	4x4	15	C	Bus Fed	PT	Spd	Full	U	3	UP	Shel	W	Tim	36x3 1/2	36x3 1/2	36x4	36x4	31	156.70	Sini	Opt	5400	150.80		
*Acme 2 1/2...	Buda HU	30.6 L	4x4	15	C	Bus Fed	PT	Spd	Full	U	3	UP	Shel	W	Tim	36x3 1/2	36x3 1/2	36x4	36x4	31	156.70	Sini	Opt	5630	156.50		
*American...	3350	Cont L4	32.4 L	4x4	15	C	Bus Fed	PT	Spd	Full	U	3	UP	Shel	W	Tim	36x3 1/2	36x3 1/2	36x4	36x4	31	156.70	Sini	Opt	5000	158.00	
Apex E...	2695	Buda HU	32.4 L	4x4	15	C	Bus Fed	PT	Spd	Full	U	3	UP	Shel	W	Tim	36x3 1/2	36x3 1/2	36x4	36x4	31	156.70	Sini	Opt	4500	150.70	
*Armeled HW...	2695	Buda HTU	32.4 L	4x4	15	C	Bus Fed	PT	Spd	Full	U	3	UP	Shel	W	Tim	36x3 1/2	36x3 1/2	36x4	36x4	31	156.70	Sini	Opt	4650	148.80	
*Armeled HW...	2695	Buda HTU	32.4 L	4x4	15	C	Bus Fed	PT	Spd	Full	U	3	UP	Shel	W	Tim	36x3 1/2	36x3 1/2	36x4	36x4	31	156.70	Sini	Opt	4900	150.80	
*Aero A...	3275	Cont C4	32.4 L	4x4	15	C	Bus Fed	PT	Spd	Full	U	3	UP	Shel	W	Tim	36x3 1/2	36x3 1/2	36x4	36x4	31	156.70	Sini	Opt	5320	151.74	
*Aerobus...	3275	Cont C4	32.4 L	4x4	15	C	Bus Fed	PT	Spd	Full	U	3	UP	Shel	W	Tim	36x3 1/2	36x3 1/2	36x4	36x4	31	156.70	Sini	Opt	4750	152.75	
*Aerobus...	3275	Cont C4	32.4 L	4x4	15	C	Bus Fed	PT	Spd	Full	U	3	UP	Shel	W	Tim	36x3 1/2	36x3 1/2	36x4	36x4	31	156.70	Sini	Opt	4200	146.65	
*Aerobus...	3275	Cont C4	32.4 L	4x4	15	C	Bus Fed	PT	Spd	Full	U	3	UP	Shel	W	Tim	36x3 1/2	36x3 1/2	36x4	36x4	31	156.70	Sini	Opt	4600	156.65	
*Aerobus...	3275	Cont C4	32.4 L	4x4	15	C	Bus Fed	PT	Spd	Full	U	3	UP	Shel	W	Tim	36x3 1/2	36x3 1/2	36x4	36x4	31	156.70	Sini	Opt	5000	156.70	
*Aerobus...	3275	Cont C4	32.4 L	4x4	15	C	Bus Fed	PT	Spd	Full	U	3	UP	Shel	W	Tim	36x3 1/2	36x3 1/2	36x4	36x4	31	156.70	Sini	Opt	5260	153.70	
*Aerobus...	3275	Cont C4	32.4 L	4x4	15	C	Bus Fed	PT	Spd	Full	U	3	UP	Shel	W	Tim	36x3 1/2	36x3 1/2	36x4	36x4	31	156.70	Sini	Opt	5360	153.70	
*Aerobus...	3275	Cont C4	32.4 L	4x4	15	C	Bus Fed	PT	Spd	Full	U	3	UP	Shel	W	Tim	36x3 1/2	36x3 1/2	36x4	36x4	31	156.70	Sini	Opt	4750	152.75	
*Bell O...	2550	Buda CA	32.4 L	4x4	15	C	Bus Fed	PT	Spd	Full	U	3	UP	Shel	W	Tim	36x3 1/2	36x3 1/2	36x4	36x4	31	156.70	Sini	Opt	4200	146.65	
Bridgport 2 1/2 B...	2850	Buda HTU	32.4 L	4x4	15	C	Bus Fed	PT	Spd	Full	U	3	UP	Shel	W	Tim	36x3 1/2	36x3 1/2	36x4	36x4	31	156.70	Sini	Opt	4600	156.70	
Brinton F...	3400	Cont C4	32.4 L	4x4	15	C	Bus Fed	PT	Spd	Full	U	3	UP	Shel	W	Tim	36x3 1/2	36x3 1/2	36x4	36x4	31	156.70	Sini	Opt	5000	156.70	
*Brookline K5...	2850	Hink HAA	32.4 L	4x4	15	C	Bus Fed	PT	Spd	Full	U	3	UP	Shel	W	Tim	36x3 1/2	36x3 1/2	36x4	36x4	31	156.70	Sini	Opt	4400	148.40	
Columbia G...	3495	Cont C4	32.4 L	4x4	15	C	Bus Fed	PT	Spd	Full	U	3	UP	Shel	W	Tim	36x3 1/2	36x3 1/2	36x4	36x4	31	156.70	Sini	Opt	4400	148.40	
Capitol K2 1/2...	4250	Wau RU	32.4 L	4x4	15	C	Bus Fed	PT	Spd	Full	U	3	UP	Shel	W	Tim	36x3 1/2	36x3 1/2	36x4	36x4	31	156.70	Sini	Opt	4400	148.40	
Capitol B...	3300	Cont C4	32.4 L	4x4	15	C	Bus Fed	PT	Spd	Full	U	3	UP	Shel	W	Tim	36x3 1/2	36x3 1/2	36x4	36x4	31	156.70	Sini	Opt	4400	148.40	
Corbit B...	3450	Wau RU	32.4 L	4x4	15	C	Bus Fed	PT	Spd	Full	U	3	UP	Shel	W	Tim	36x3 1/2	36x3 1/2	36x4	36x4	31	156.70	Sini	Opt	4400	148.40	
Day Elder C...																											

3 Ton
Back Wagon

Concord BX*	1
Denby 25	1
Douglas 1-3	1
Forrester E.	1
F. W. D. B.	1
Gerasim L.	1
Gersim Bernstein 30	1
International 61	1
Italy	1
Jumbo 30	1
Kuhn II K	1
Luverne Express	1
Packard ED	1
Patrol Washington	1
Ritter B.	1
Rowe GPW2	1
Rowe GSW3	1
Sloughton F.	1

4. $a_1 = -1 = 0 - 1$

Trade Name and Model	Chassis No.	Bore and Stroke	N. A. C. G. Horsepower	V-Live Arrangement	Radiator (Blaize)	Radiator (Type)	Fuel Feed	Carburetor	Lubrication	Gearing (Blaize)	Gearing (Type)	Engine Starter	Cylinder System	Make	Speeds (Blaize)	Springs (Blaize)	Type	TIRES, WHEELS, RIMS		Front	Rear	Tires (Blaize)	Wheelbase	Center of Weight	Front Weight	Rear Weight	Chassis Weight	Pr. Center of Weight	Front Weight	Rear Weight	Chassis Weight		
																		GEARSET		GEARSET	REAR AXLE	TIRES, WHEELS, RIMS											
3 Ton—Con'd																		10	11	12	13	14	15	16	17	18	19	20	21	22	23		
Traffic 6000	1895	3 1/2 x 5 1/2	22.5	L	T	Own	C	Cart G	Own	Covt DP	Bos	Sp1	Pier	M-E	Det	W	Russ	D 3/4	32.2	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Taylor D-6	3300	4 1/2 x 5 1/2	28.9	L	T	Own	C	Cart G	Own	Pier B-Li	Bos	Sp1	Pier B-Li	M-E	Det	W	Shel	7.7	32.2	32	32	32	32	32	32	32	32	32	32	32	32	32	
Ultimate BL.	3860	4 1/2 x 5 1/2	28.9	L	T	Own	C	Cart G	Own	Pier B-Li	Bos	Sp1	Pier B-Li	M-E	Det	W	Shel	7.7	32.2	32	32	32	32	32	32	32	32	32	32	32	32	32	
U. S. R.	3950	4 1/2 x 5 1/2	25.6	L	T	Own	C	Cart G	Own	Pier B-Li	Bos	Sp1	Pier B-Li	M-E	Det	W	Shel	7.7	32.2	32	32	32	32	32	32	32	32	32	32	32	32	32	
Vin 23	3600	4 1/2 x 5 1/2	28.9	L	T	Own	C	Cart G	Own	Pier B-Li	Bos	Sp1	Pier B-Li	M-E	Det	W	Shel	7.7	32.2	32	32	32	32	32	32	32	32	32	32	32	32	32	
*Wichita RX.																																	
3 1/2 Ton																																	
*Aeason L.																																	
Aome C.	3975	4 1/2 x 5 1/2	32.4	L	T	Own	C	Cart G	Own	Pier B-Li	Bos	Sp1	Pier B-Li	M-E	Det	W	Shel	7.7	32.2	32	32	32	32	32	32	32	32	32	32	32	32	32	
Apex F.																																	
Armedier KW.																																	
Armedier K.W.																																	
*Atherbury 7D-LWB.	4075	4 1/2 x 5 1/2	32.4	L	T	Own	C	Cart G	Own	Pier B-Li	Bos	Sp1	Pier B-Li	M-E	Det	W	Shel	7.7	32.2	32	32	32	32	32	32	32	32	32	32	32	32	32	
*Atherbury 7D-Standard.	3975	4 1/2 x 5 1/2	32.4	L	T	Own	C	Cart G	Own	Pier B-Li	Bos	Sp1	Pier B-Li	M-E	Det	W	Shel	7.7	32.2	32	32	32	32	32	32	32	32	32	32	32	32	32	
*Autocar Y.	4350	4 1/2 x 5 1/2	28.9	L	T	Own	C	Cart G	Own	Pier B-Li	Bos	Sp1	Pier B-Li	M-E	Det	W	Shel	7.7	32.2	32	32	32	32	32	32	32	32	32	32	32	32	32	
*Autocar B.	4500	4 1/2 x 5 1/2	32.4	L	T	Own	C	Cart G	Own	Pier B-Li	Bos	Sp1	Pier B-Li	M-E	Det	W	Shel	7.7	32.2	32	32	32	32	32	32	32	32	32	32	32	32	32	
Belmont D.	4175	4 1/2 x 5 1/2	32.4	L	T	Own	C	Cart G	Own	Pier B-Li	Bos	Sp1	Pier B-Li	M-E	Det	W	Shel	7.7	32.2	32	32	32	32	32	32	32	32	32	32	32	32	32	
Bridgeport 4C	3850	4 1/2 x 5 1/2	32.4	L	T	Own	C	Cart G	Own	Pier B-Li	Bos	Sp1	Pier B-Li	M-E	Det	W	Shel	7.7	32.2	32	32	32	32	32	32	32	32	32	32	32	32	32	
*Brockway R4																																	
Capitol M-3 1/2.	4425	4 1/2 x 5 1/2	32.4	L	T	Own	C	Cart G	Own	Pier B-Li	Bos	Sp1	Pier B-Li	M-E	Det	W	Shel	7.7	32.2	32	32	32	32	32	32	32	32	32	32	32	32	32	
*Chiraco 90C.																																	
*Clydebilt 90C.																																	
Cordbilt A.	4100	4 1/2 x 5 1/2	32.4	L	T	Own	C	Cart G	Own	Pier B-Li	Bos	Sp1	Pier B-Li	M-E	Det	W	Shel	7.7	32.2	32	32	32	32	32	32	32	32	32	32	32	32	32	
Couple Gear HC.	6100	4 1/2 x 5 1/2	25.6	L	T	Own	C	Cart G	Own	Pier B-Li	Bos	Sp1	Pier B-Li	M-E	Det	W	Shel	7.7	32.2	32	32	32	32	32	32	32	32	32	32	32	32	32	
Dart W.	3750	4 1/2 x 5 1/2	32.4	L	T	Own	C	Cart G	Own	Pier B-Li	Bos	Sp1	Pier B-Li	M-E	Det	W	Shel	7.7	32.2	32	32	32	32	32	32	32	32	32	32	32	32	32	
Day Elder F.	3750	4 1/2 x 5 1/2	32.4	L	T	Own	C	Cart G	Own	Pier B-Li	Bos	Sp1	Pier B-Li	M-E	Det	W	Shel	7.7	32.2	32	32	32	32	32	32	32	32	32	32	32	32	32	
Dependable G 3 1/2.	3550	4 1/2 x 5 1/2	32.4	L	T	Own	C	Cart G	Own	Pier B-Li	Bos	Sp1	Pier B-Li	M-E	Det	W	Shel	7.7	32.2	32	32	32	32	32	32	32	32	32	32	32	32	32	
Diamond-T-K.	4675	4 1/2 x 5 1/2	28.9	L	T	Own	C	Cart G	Own	Pier B-Li	Bos	Sp1	Pier B-Li	M-E	Det	W	Shel	7.7	32.2	32	32	32	32	32	32	32	32	32	32	32	32	32	
Doane 3 1/2.	5100	4 1/2 x 5 1/2	28.9	L	T	Own	C	Cart G	Own	Pier B-Li	Bos	Sp1	Pier B-Li	M-E	Det	W	Shel	7.7	32.2	32	32	32	32	32	32	32	32	32	32	32	32	32	
Doris K7	4400	4 1/2 x 5 1/2	28.9	L	T	Own	C	Cart G	Own	Pier B-Li	Bos	Sp1	Pier B-Li	M-E	Det	W	Shel	7.7	32.2	32	32	32	32	32	32	32	32	32	32	32	32	32	
Duplex E.	4250	4 1/2 x 5 1/2	32.4	L	T	Own	C	Cart G	Own	Pier B-Li	Bos	Sp1	Pier B-Li	M-E	Det	W	Shel	7.7	32.2	32	32	32	32	32	32	32	32	32	32	32	32	32	
*Fagor E.	3950	4 1/2 x 5 1/2	32.4	L	T	Own	C	Cart G	Own	Pier B-Li	Bos	Sp1	Pier B-Li	M-E	Det	W	Shel	7.7	32.2	32	32	32	32	32	32	32	32	32	32	32	32	32	
Federal WE.	4050	4 1/2 x 5 1/2	32.4	L	T	Own	C	Cart G	Own	Pier B-Li	Bos	Sp1	Pier B-Li	M-E	Det	W	Shel	7.7	32.2	32	32	32	32	32	32	32	32	32	32	32	32	32	
Garif 7D.	4050	4 1/2 x 5 1/2	32.4	L	T	Own	C	Cart G	Own	Pier B-Li	Bos	Sp1	Pier B-Li	M-E	Det	W	Shel	7.7	32.2	32	32	32	32	32	32	32	32	32	32	32	32	32	
Giant 17.	4150	4 1/2 x 5 1/2	32.4	L	T	Own	C	Cart G	Own	Pier B-Li	Bos	Sp1	Pier B-Li	M-E	Det	W	Shel	7.7	32.2	32	32	32	32	32	32	32	32	32	32	32	32	32	
G. M. C. K-71.	4250	4 1/2 x 5 1/2	32.4	L	T	Own	C	Cart G	Own	Pier B-Li	Bos	Sp1	Pier B-Li	M-E	Det	W	Shel	7.7	32.2	32	32	32	32	32	32	32	32	32	32	32	32	32	
Gramm-Berstein 35.	4375	4 1/2 x 5 1/2	32.4	L	T	Own	C	Cart G	Own	Pier B-Li	Bos	Sp1	Pier B-Li	M-E	Det	W	Shel	7.7	32.2	32	32	32	32	32	32	32	32	32	32	32	32	32	
Independent K. (Ohio)	3000	4 1/2 x 5 1/2	32.4	L	T	Own	C	Cart G	Own	Pier B-Li	Bos	Sp1	Pier B-Li	M-E	Det	W	Shel	7.7	32.2	32	32	32	32	32	32	32	32	32	32	32	32	32	
Indiana 35.	3850	4 1/2 x 5 1/2	32.4	L	T	Own	C	Cart G	Own	Pier B-Li	Bos	Sp1	Pier B-Li	M-E	Det	W	Shel	7.7	32.2	32	32	32	32	32	32	32	32	32	32	32	32	32	
*Jackson B.	4000	4 1/2 x 5 1/2	32.4	L	T	Own	C	Cart G	Own	Pier B-Li	Bos	Sp1	Pier B-Li	M-E	Det	W	Shel	7.7	32.2	32	32	32											

THE COMMERCIAL CAR JOURNAL

OCTOBER 15, 1921

Trade Name and Model	Chassis Price	ENGINE DETAILS										GEARSET										TIRES, WHEELS, RIMS		Wheels Weight				
		Model Number	Number of Cylinders	Displacement	How Cooled	Water Attenuator	Cooler	Radiator (Type)	Radiator Feed	Engine System	Cyl. (Type)	Cyl. (Make)	Universal (Make)	Splines (Make)	Front Dirs.	Front Dirs.	Rear	Pneumatic (Dual)	Pneumatic (Dual)	Front	Rear	Front	Front	Front	Front			
5 Ton-Con'd																												
Master B.	5200	Buda ATU	4 1/2 x 6 1/2	36.1 L	C	Chio	PT	FS	Max	V	4	B-Li	A	4	Spic	Det	W	Timk	Flat	11.6	56.43	Ros	36x6	40x6	21			
Master B.L.	5380	Buda ATU	4 1/2 x 6 1/2	36.1 L	C	Chio	PT	FS	Max	V	4	B-Li	A	4	Spic	Det	W	Timk	Flat	11.6	56.43	Ros	36x6	40x6	22			
Master F.	5440	Buda ATU	4 1/2 x 6 1/2	36.1 L	C	Chio	PT	FS	Max	V	4	B-Li	A	4	Spic	Det	R	Walk	Flat	11.5	55.6	Ros	36x6	40x6	23			
Master F.L.	5540	Buda ATU	4 1/2 x 6 1/2	36.1 L	C	Chio	PT	FS	Max	V	4	B-Li	A	4	Spic	Det	R	Walk	Flat	11.5	55.6	Ros	36x6	40x6				
Metominee J.	5450	Wis RAU	4 1/2 x 6 1/2	36.1 L	C	Chio	PT	FS	Max	V	4	B-Li	A	4	Spic	Det	R	Walk	Flat	11.5	55.6	Ros	36x6	40x6				
Moreland & LeMoon FC5.	5000	Cont B2	4 1/2 x 6 1/2	36.1 L	C	Own	Fin	FS	Max	V	4	Own	A	5	Ther	US	W	Timk	Flat	11.6	61.3	Ros	36x6	40x6				
Nelson & LeMoon FC5.	5000	Cont B2	4 1/2 x 6 1/2	36.1 L	C	Chio	Fin	FS	Max	V	4	Own	A	5	Ther	US	W	Timk	Flat	11.6	61.3	Ros	36x6	40x6				
Ogden G.	5000	Cont B2	4 1/2 x 6 1/2	36.1 L	C	Chio	Fin	FS	Max	V	4	Own	A	5	Ther	US	W	Timk	Flat	11.6	61.3	Ros	36x6	40x6				
Old Reliable D.	5000	Wis RAU	4 1/2 x 6 1/2	36.1 L	C	Chio	PT	FS	Max	V	4	Own	A	5	Ther	US	W	Timk	Flat	11.6	61.3	Ros	36x6	40x6				
*Oneida E9.	4550	Oneida	4 1/2 x 6 1/2	32.4 H	C	Own	C	Stn	V	Mon	WD	Bos	B-Li	A	4	Spic	Det	R	Walk	Flat	10.33	50.80	Ros	36x6	40x6			
Packard EF.	4300	Own	5	26 1/2	40	L	C	Own	P	Mon	WD	Bos	B-Li	A	4	Spic	Det	R	Walk	Flat	10.25	41.5	Ros	36x6	40x6			
Parker M20.	5500	Wis RAU	4 1/2 x 6 1/2	36.1 L	C	Own	P	Stn	V	Mon	WD	Bos	B-Li	A	4	Spic	Det	R	Walk	Flat	10.18	50.80	Ros	36x6	40x6			
Pierres Arrow R10.	4850	Own	4 1/2 x 6 1/2	32.4 T	C	Own	P	Stn	V	Mon	WD	Bos	B-Li	A	4	Spic	Det	R	Walk	Flat	10.16	50.72	Ros	36x6	40x6			
Rainier R-17.	5100	Cont B2	4 1/2 x 6 1/2	32.4 H	C	Own	P	Stn	V	Mon	WD	Bos	B-Li	A	4	Spic	Det	R	Walk	Flat	10.15	50.72	Ros	36x6	40x6			
Reynolds 10A.	5550	Wise VAU	4 1/2 x 6 1/2	32.4 H	C	Own	P	Stn	V	Mon	WD	Bos	B-Li	A	4	Spic	Det	R	Walk	Flat	10.14	50.72	Ros	36x6	40x6			
Sandow L.	4975	Cont E4	4 1/2 x 6 1/2	32.4 L	C	Own	P	Stn	V	Mon	WD	Bos	B-Li	A	4	Spic	Det	R	Walk	Flat	10.13	50.72	Ros	36x6	40x6			
Sandow W50.	5100	Cont E4	4 1/2 x 6 1/2	32.4 L	C	Own	P	Stn	V	Mon	WD	Bos	B-Li	A	4	Spic	Det	R	Walk	Flat	10.12	50.72	Ros	36x6	40x6			
Schmidt.	4900	Buda YTU	4 1/2 x 6 1/2	32.4 L	C	Own	P	Stn	V	Mon	WD	Bos	B-Li	A	4	Spic	Det	R	Walk	Flat	10.11	50.72	Ros	36x6	40x6			
Schwarts DW8.	4900	Buda YTU	4 1/2 x 6 1/2	32.4 L	C	Own	P	Stn	V	Mon	WD	Bos	B-Li	A	4	Spic	Det	R	Walk	Flat	10.10	50.72	Ros	36x6	40x6			
Schwarts DW8.	4900	Buda YTU	4 1/2 x 6 1/2	32.4 L	C	Own	P	Stn	V	Mon	WD	Bos	B-Li	A	4	Spic	Det	R	Walk	Flat	10.09	50.72	Ros	36x6	40x6			
Seldan 5A.	5600	Cont S2	4 1/2 x 6 1/2	32.4 L	C	Own	P	Stn	V	Mon	WD	Bos	B-Li	A	4	Spic	Det	R	Walk	Flat	10.08	50.72	Ros	36x6	40x6			
Service 101.	5300	Cont B2	4 1/2 x 6 1/2	32.4 L	C	Own	P	Stn	V	Mon	WD	Bos	B-Li	A	4	Spic	Det	R	Walk	Flat	10.07	50.72	Ros	36x6	40x6			
Signal R.	5300	Cont B2	4 1/2 x 6 1/2	32.4 L	C	Own	P	Stn	V	Mon	WD	Bos	B-Li	A	4	Spic	Det	R	Walk	Flat	10.06	50.72	Ros	36x6	40x6			
*Standard 5 1/2.	4400	Cont B2	4 1/2 x 6 1/2	32.4 L	C	Own	P	Stn	V	Mon	WD	Bos	B-Li	A	4	Spic	Det	R	Walk	Flat	10.05	50.72	Ros	36x6	40x6			
*Sterling 5-Worm.	4950	Buda YTU	4 1/2 x 6 1/2	32.4 L	C	Own	P	Stn	V	Mon	WD	Bos	B-Li	A	4	Spic	Det	R	Walk	Flat	10.04	50.72	Ros	36x6	40x6			
Super Truck 100.	5500	Ster EU	5 x 6 1/2	40	L	Own	C	Stn	V	Mon	WD	Bos	B-Li	A	4	Spic	Det	R	Walk	Flat	10.03	50.72	Ros	36x6	40x6			
Tiffin 6.	4800	Wau DU	4 1/2 x 6 1/2	36.1 L	C	Own	P	Stn	V	Mon	WD	Bos	B-Li	A	4	Spic	Det	R	Walk	Flat	10.02	50.72	Ros	36x6	40x6			
Traylor F.	4700	Buda YTU	4 1/2 x 6 1/2	36.1 L	C	Own	P	Stn	V	Mon	WD	Bos	B-Li	A	4	Spic	Det	R	Walk	Flat	10.01	50.72	Ros	36x6	40x6			
Twin City 4-Wh. Drive DA.	5250	Wau EU	4 1/2 x 6 1/2	36.1 L	C	Own	P	Stn	V	Mon	WD	Bos	B-Li	A	4	Spic	Det	R	Walk	Flat	10.00	50.72	Ros	36x6	40x6			
United V. 5.	5000	Wau DU	4 1/2 x 6 1/2	36.1 L	C	Own	P	Stn	V	Mon	WD	Bos	B-Li	A	4	Spic	Det	R	Walk	Flat	10.00	50.72	Ros	36x6	40x6			
U.S. T.	5100	Wau DU	4 1/2 x 6 1/2	36.1 L	C	Own	P	Stn	V	Mon	WD	Bos	B-Li	A	4	Spic	Det	R	Walk	Flat	10.00	50.72	Ros	36x6	40x6			
Walter S.	5600	Ward La. France 5A.	5500	Ward La. France 5A.	4 1/2 x 6 1/2	36.1 L	C	Own	P	Stn	V	Mon	WD	Bos	B-Li	A	4	Spic	Det	R	Walk	Flat	10.00	50.72	Ros	36x6	40x6	
White 45.	4500	Wilson H.	4520	Wilson H.	4 1/2 x 6 1/2	36.1 L	C	Own	P	Stn	V	Mon	WD	Bos	B-Li	A	4	Spic	Det	R	Walk	Flat	10.00	50.72	Ros	36x6	40x6	
Wintner 109.	5250	Wise VAU	4 1/2 x 6 1/2	36.1 L	C	Own	P	Stn	V	Mon	WD	Bos	B-Li	A	4	Spic	Det	R	Walk	Flat	10.00	50.72	Ros	36x6	40x6			
Available H7.	6000	Her T3	5 x 6	40	L	C	Chio	Fin	FS	Stn	V	Mon	WD	Bos	B-Li	A	4	Spic	Det	R	Walk	Flat	10.00	50.72	Ros	36x6	40x6	
Bartlett 70.	7350	Wis RRU	5 x 6	40	L	C	Chio	Fin	FS	Stn	V	Mon	WD	Bos	B-Li	A	4	Spic	Det	R	Walk	Flat	10.00	50.72	Ros	36x6	40x6	
Doane 6.	6000	Wau EU	5 x 6 1/2	40	L	C	Own	P	Stn	V	Mon	WD	Bos	B-Li	A	4	Spic	Det	R	Walk	Flat	10.00	50.72	Ros	36x6	40x6		
Gardford 150 A-7 1/2.	6000	Wau EU	5 x 6 1/2	40	L	C	Own	P	Stn	V	Mon	WD	Bos	B-Li	A	4	Spic	Det	R	Walk	Flat	10.00	50.72	Ros	36x6	40x6		
Hall 7 Chain.	5100	Cont E4	4 1/2 x 6 1/2	32.4 L	C	Own	P	Stn	V	Mon	WD	Bos	B-Li	A	4	Spic	Det	R	Walk	Flat	10.00	50.72	Ros	36x6	40x6			
Kelly-Springfield KG60.	5750	Buda YTU	4 1/2 x 6 1/2	32.4 L	C	Own	P	Stn	V	Mon	WD	Bos	B-Li	A	4	Spic	Det	R	Walk	Flat	10.00	50.72	Ros	36x6	40x6			
MacDonald A.	5750	Wau DU	4 1/2 x 6 1/2	32.4 L	C	Own	P	Stn	V	Mon	WD	Bos	B-Li	A	4	Spic	Det	R	Walk	Flat	10.00	50.72	Ros	36x6	40x6			
Mack AC71/2.	6000	Wau AC	5 x 6	40	L	C	Chio	Fin	FS	Stn	V	Mon	WD	Bos	B-Li	A	4	Spic	Det	R	Walk	Flat	10.00	50.72	Ros	36x6	40x6	
Old Reliable K L. M.	6000	Wau AC	5 x 6	40	L	C	Chio	Fin	FS	Stn	V	Mon	WD	Bos	B-Li	A	4	Spic	Det	R	Walk	Flat	10.00	50.72	Ros	36x6	40x6	
*Sterling 5 1/2-Chain.	6000	Cont B2	4 1/2 x 6 1/2	36.1 L	C	Own	P	Stn	V	Mon	WD	Bos	B-Li	A	4	Spic	Det	R	Walk	Flat	10.00	50.72	Ros	36x6	40x6			
Union J.W.	5800	Wau RBU	4 1/2 x 6 1/2	36.1 L	C	Own	P	Stn	V	Mon	WD	Bos	B-Li	A	4	Spic	Det	R	Walk	Flat	10.00	50.72	Ros	36x6	40x6			
*Winton H.	5000	Beav JRB.	4 1/2 x 6 1/2	36.1 L	C	Own	P	Stn	V	Mon	WD	Bos	B-Li	A	4	Spic	Det	R	Walk	Flat	10.00	50.72	Ros	36x6	40x6			
Wintner 140.	5900	Wise RBU	5 x 6	40	L	C	Chio	Fin	FS	Stn	V	Mon	WD	Bos	B-Li	A	4	Spic	Det	R	Walk	Flat	10.00	50.72	Ros	36x6	40x6	
5 1/2, 6 and 7 Ton	6000	Her T3	5 x 6	40	L	C	Chio	Fin	FS	Stn	V	Mon	WD	Bos	B-Li</													

Lombard—T. T.—Lombard Auto Tractor Truck Corp., New York, N. Y.
Luedinghaus—1, 1½, 2—Luedinghaus-Espenschied Wagon Co., St. Louis, Mo.
Luverne—2, 3—Luverne Automobile Co., Luverne, Minn.
Maccar—1½, 2½, 3½, 5—Maccar Truck Co., Scranton, Pa.
MacDonald—7—MacDonald Truck & Tractor Co., San Francisco, Cal.
Mack—1½, 2, 2½, 3½, 5, 6½, 7½, T. T.—International Motor Co., New York, N. Y.
Master—1½, 2½, 3½, 5, T. T.—Master Trucks, Inc., Chicago, Ill.
Maxwell—1½—Maxwell Motor Co., Inc., Detroit, Mich.
Menominee—1, 1½, 2, 3½, 5—Menominee Motor Truck Co., Menominee, Mich.
Moline—1½—Moline Plow Co., Moline, Ill.
Moreland—1½, 2½, 4, 5—Moreland Motor Truck Co., Los Angeles, Cal.
Mutual—2, 2½—Mutual Truck Co., Sullivan, Ind.
Napoleon—¾, 1, 1½—Napoleon Motors Co., Traverse City, Mich.
Nash—1, 2—Nash Motors Co., Kenosha, Wis.
Nelson-LeMoon—1, 1½, 2½, 3½, 5—Nelson & LeMoon, Chicago, Ill.
Netco—2, 2½—New England Truck Co., Fitchburg, Mass.
Niles—2—Niles Motor Truck Co., Pittsburgh, Pa.
Noble—1½, 2, 2½, 3½—Noble Motor Truck Co., Kendallville, Ind.
Northway—2, 3½—Northway Motors Co., Natick, Mass.
Norwalk—1, 1½—Norwalk Motor Car Co., Martinsburg, W. Va.
O. K.—1½, 2½, 3½—Oklahoma Auto Mfg. Co., North Muskogee, Okla.
Ogden—1½, 2½, 3½, 5—Ogden Motor Truck Co., Chicago, Ill.
Old Hickory—1—Kentucky Wagon Mfg. Co., Louisville, Ky.
Old Reliable—1½, 2½, 3½, 5, 6—Old Reliable Motor Truck Co., Chicago, Ill.
Oldsmobile—1—Olds Motor Works, Lansing, Mich.
Olympic—2½—Olympic Motor Truck Co., Tacoma, Wash.
Oneida—1½, 1½, 2½, 3½, 5—Oneida Motor Truck Co., Green Bay, Wis.
Oshkosh—2—Oshkosh Motor Truck Mfg. Co., Oshkosh, Wis.
Packard—2, 3, 5—Packard Motor Car Co., Detroit, Mich.
Paige—1½, 2½, 3½—Paige-Detroit Motor Car Co., Detroit, Mich.
Parker—2, 3½, 5—Parker Motor Truck Co., Milwaukee, Wis.
Patriot—1, 2, 3—Patriot Motors Co., Lincoln, Neb.
Penn—2—Penn Motor Corp., Philadelphia, Pa.
Pierce-Arrow—2, 3½, 5—Pierce-Arrow Motor Car Co., Buffalo, N. Y.
Pioneer—1—Pioneer Truck Co., Chicago, Ill.
Pittsburgher—2½—Pittsburgh Truck Mfg. Co., Pittsburgh, Pa.
Power—1½, 3½—Power Truck & Tractor Co., St. Louis, Mo.
Premocar—1½—Preston Motors Corp., Birmingham, Ala.
Rainier—¾, 1, 1½, 2, 2½, 3½, 5—Rainier Motor Corp., Flushing, L. I., N. Y.
Ranger—2—Southern Motor Mfg. Ass'n, Ltd., Houston, Tex.
Reliance—1½, 2½—Reliance Motor Truck Co., Appleton, Wis.
Reo—1½—Reo Motor Car Co., Lansing, Mich.
Republic—¾, 1, 1½, 2½, 3½—Republic Motor Truck Co., Inc., Alma, Mich.
Reynolds—1½, 2½, 3½, 5—Reynolds Motor Truck Co., Mt. Clemens, Mich.
Riker—3, 4—Locomobile Co. of America, Bridgeport, Conn.
Rowe—1½, 2, 3, 4, 5—Rowe Motor Mfg. Co., Lancaster, Pa.
Rumely—1½—Advance-Rumely Thresher Co., Inc., La Porte, Ind.
Samson—¾, 1½—Samson Tractor Co., Janesville, Wis.
Sandow—1, 1½, 2, 2½, 3½, 5—Sandow Motor Truck Co., Chicago, Ill.
Sanford—2½, 3½, 5—Sanford Motor Truck Co., Syracuse, N. Y.
Schacht—2, 2½, 3½, 5—G. A. Schacht Motor Truck Co., Cincinnati, Ohio.

New Plant Fire Control

A fire alarm and what is perhaps the largest watchman's control board yet built, was recently installed in the plant of the Kelly-Springfield Tire Co., Cumberland, Md. The new buildings cover twelve acres and provide 22 acres of floor space. The material required for this modern factory was enough to make a train fifty miles long. Recognition of the stupendous annual fire wastage, both monetarily and in human casualties, prompted this tire company to extend itself in an effort to curtail and control the fire menace.

The board shown here, which measures 9 ft. 8 in. by 6 ft. 2 in., is the "heart" of a complete Fire and Watchman's System, which is safeguarding the factory twenty-four hours of the day. When a fire-box is pulled in any part of the building, a huge electrically operated steam whistle, which can be heard all over the valley, is automatically sounded.

Should it be found necessary to clear any floor in any part of any building, this is accomplished by signal bells which are operated from the control board. Signals for fire-drills or for starting and stopping work in the whole or certain parts of the factory may also be given from the board. A unique feature of this control board is the watchman's signals.

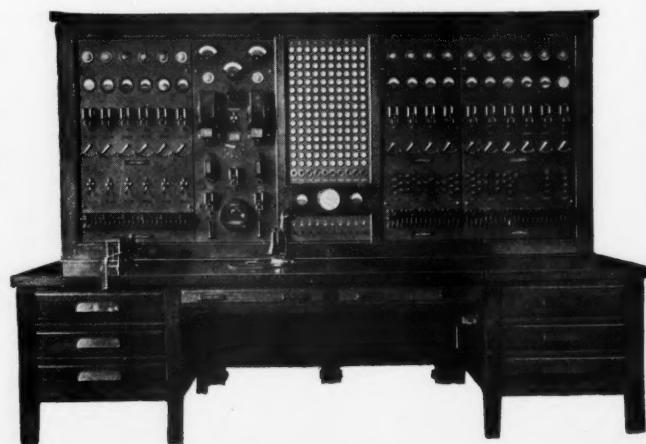
As the several watchmen go from station to station, the head watchman at the desk can observe their progress by the proper sequence of the lamp signals (see center of board). A number of the combined Fire and Watchman's Stations are equipped with telephones, and should a watchman miss a station he can be caught almost at the next station by telephone, enabling the chief at the board to ascertain at once why that station was passed. In this way, however lonely, hazardous or distant the trips, the watchmen are never out of immediate touch with the man at the desk. In addition, and as a further precaution, an indelible record is made by a punched hole in a properly timed and spaced dial sheet of every station visited by every watchman.

Fire Control Board of One of the Largest Industrial Fire Alarm Systems Installed.

Even if the head watchman is inclined to overlook the missing of a station here and there, he cannot get away from the dial record which is kept under lock and key in the clock cabinet.

The watchman's clock stands 8 ft. 6 in. high. Only the general manager or some other high executive has the key to the clock cabinet, and the records made on the dial sheet thereon are final.

This control board, including wiring, circuits, fire and watchman's boxes and stations, were designed and manufactured by The Holtzer-Cabot Electric Co., Boston, Mass.



Metal and Rubber Markets

Fall Trade in Steel Industry Improving

Fall trade in the steel industry is opening with an all around stronger sentiment, but as yet with no substantial improvement in the volume of tonnage placed. The period of extreme depression, however, has apparently passed, and from now steady but slow progress is expected.

The tonnage of manganese steel placed during the last four or five weeks has been slightly heavier in comparison with recent months. The tractor industry is still dormant.

Steel Products Prices

Per ton—Pittsburgh—

Bessemer billets	\$29.00	a 30.00
Open hearth	29.00	a 30.00
Forging billets	34.00	a 35.00
Sheet bars	30.00	a 32.00

Sheets

The following prices are for 100-bundle lots and over, f.o.b. mill:

Blue Annealed Sheets—

Pittsburgh (base)	\$2.50	a
Philadelphia	2.85	a
New York	2.88	a
Galvanized Sheets of Black Sheet Gauge—		
Pittsburgh	\$4.00	a
New York	4.38	a

Finished Iron and Steel

Tank plates, Pittsburgh	\$1.60	a 1.65
Tank plates, New York	1.98	a 2.03
Steel bars, New York	1.98	a 2.08
Steel bars, Pittsburgh	1.60	a 1.70

Iron and Steel at Pittsburgh

Bessemer iron	\$21.96	a
Skelp, grooved steel	1.70	a 1.80
Skelp, sheared steel	1.70	a 1.80
Strip steel, cold	3.75	a 4.00
Strip steel, hot	2.25	a 2.40
Ferromanganese (78-82%)	60.00	a 63.00
Steel, melting scrap	14.00	a

Miscellaneous Metals

Copper sheets, hot rolled	\$19.50	a
Copper rolls	18.00	a
Copper bottoms	27.00	a
Copper rods	18.00	a 18.75
Seamless tubing, bronze	20.50	a
Seamless tubing, copper	19.50	a
Seamless low brass tubing	19.50	a
Seamless high brass tubing	18.00	a
High brass rods	13.25	a
Low brass rods	17.75	a
Brazed tubing, brass	25.00	a
Brazed tubing, bronze	29.75	a
Brazed tubing, copper	29.75	a

ANTIMONY—Demand continues light, and while sellers are not forcing the market, buyers offer no encouragement.

MANGANESE—No business to speak of. Lowering of prices per unit no attraction.

OLD METALS—Aluminum scrap continues quiet but steady. Scrap copper is strong, especially in the case of heavy cut and crucible. Block tin scrap and pewter dishes are still active and reported scarce. Latest buying and selling

prices, f.o.b. cars New York follow:

Aluminum—	Buying.	Selling
Cast scrap	8 a 8 1/4	9 a 9 1/4
Sheet scrap	8 a 8 1/4	8 1/2 a 9 1/4
Clippings	11 1/2 a 12	13 a 14
Copper—		
Heavy machinery comp.	7 1/4 a 7 1/2	8 1/4 a 8 1/2
Light and bottoms	7 1/4 a 8	8 1/4 a 8 1/2
Heavy, cut and crucible	9 1/2 a 10	10 1/2 a 11 1/4
Brass, heavy	4 1/4 a 4 1/2	4 1/4 a 5
Brass, casting	5 1/4 a 5 1/2	5 1/4 a 6 1/4
Brass, light	3 1/4 a 3 1/2	4 a 4 1/4
No. 1 clean brass turnings	4 a 4 1/4	4 1/2 a 4 1/4
No. 1 comp. turnings	5 1/4 a 6	6 1/4 a 6 1/2
Tea lead	2 1/4 a 2 1/4	2 1/4 a 3
Lead, heavy	3 1/4 a 3 1/2	4 a 4 1/4
Zinc scrap	2 a 2 1/2	2 1/2 a 3
Solder joints	4 1/4 a 5	5 1/4 a 5 1/2
New zinc clippings	3 a 3 1/4	3 1/2 a 4
Pewter dishes	14 1/4 a 14 1/2	15 a 16
Block tin, scrap	22 a 23	24 a 25

Rubber Quiet

Market for plantation rubber still quiet. Demand from large dealers still lacking, and that from other quarters of limited

Interest in Road Improvement Maintained

According to figures compiled from reports submitted from states, counties, cities and townships to The Asphalt Association, New York, for the month of July, the value of contemplated bond issues for highway work dropped \$25,562,105.36 below the figures for June. The showing is encouraging in view of the fact that paving bond issues generally are provided in the early part of the year and in the fall. That the reduction does not materially affect the highway construction boom is shown when it is realized that

extent. Steady tone continues. Paras also quiet.

Para—Up-river, fine	21	a	21 1/2
Up-river, coarse	11 1/2	a	...
Island, fine	18	a	18 1/2
Island, coarse	9 1/2	a	9 1/2
Caucho, ball, upper	11 1/2	a	...
Caucho, ball, lower	9 1/2	a	10
Cameta	9	a	9 1/2
Amber—No. 1	14	a	...
No. 2	13	a	...
No. 3	12	a	...
Smoked ribbed sheets	15 1/2	a	...
*Centrals—Corinto	...	a	6
*Esmeralda	...	a	6
*Mexican scrap	...	a	5
*Guayule, wet	...	a	10
*Guayule, dry	...	a	25
*Balata, block, Trinidad	...	a	73
*Balata, block, Colombian	...	a	26
*Balata, Panama	...	a	25
*Balata, sheet	...	a	58

*Nominal

SCRAP RUBBER.—On the advance of crude rubber, dealers in scrap rubber are placing their hope for better business, as present trading is spotty.

Inner tubes, No. 2	...	a	2
Inner tubes, No. 1	...	a	4 1/2
Tires—Automobile	...	1/2	a

the total amount of bonds actually voted up to January 1, 1914, as ascertained by the U. S. Office of Public Roads was only \$445,147,073.

July reports showed contemplated improvements, both in road-building and street construction, amounting to \$153,745,254, with 345 projects, compared to \$179,307,359.36 for 310 projects in June. The reports for May showed contemplated bond issues amounting to \$164,371,353 and a total of 259 projects. During the three months 914 projects were reported with a total of \$597,423,966.36 in contemplated bond issues.



Complete Bowser Crankcase Oil Reclaiming Installation Operated by a Fort Wayne Concern

This will convey a clear idea of the appearance and general arrangement of the oil reclaiming outfit recently announced by the S. F. Bowser & Co., Inc., Fort Wayne, Ind., and described in the August issue of the Commercial Car Journal, page 74, to those of our readers who are interested. The company using this outfit was recently formed expressly for the purpose of reclaiming motor crank case oil. This oil is collected from the various commercial concerns, garages, repair shops, etc., and reclaimed at a certain flat rate; or, if these concerns do not care to bother with the used oil, the company buys it outright, reclaims it and retails or wholesales the renewed oil, according to market conditions.

Price List of Truck Pneumatic Tire Casings, With Capacities and Inflation Pressures of Larger Sizes

30		32		34		36		38		40		42		44			
3/4	4	4	4 1/2	5	5	5	5	6	6	6	6	6	6	6	6		
Acme Rubber Mfg. Co., Trenton, N. J.	41.00	44.00	48.00	51.00	58.00	60	62.00	94.00	2200	90	132.00	3000	100	162.95	4000		
Acme Cord, non-skid																	
Ajax Rubber Co., Inc., New York, N. Y.	26.20	44.05	46.60	49.80	52.25	61.95	63.55	65.15	87.25	2000	90	126.50	3000	100	162.95	4000	
Ajax Cord, non-skid																	
Amazon Rubber Co., Akron, O.	25.00	46.25	48.75	52.10	54.85	65.05	67.00	68.20	98.90	2200	90	128.25	3000	100	165.20	4000	
Amazon Cord, non-skid																	
American Rubber & Tire Co., Akron, O.	24.50	43.90	46.40	49.70	52.10	61.80	68.75	65.00	91.85	2000	90	128.25	3000	100	165.20	4000	
American Cord, non-skid																	
Beacon Tire Co., Inc., Beacon, N. Y.	30.30	46.30	48.95	52.35	54.90	65.20	68.45	72.50	97.25	2200	90	126.50	3000	100	162.95	4000	
Beacon Rib Skid Cord (Red Seal)																	
Bergougnan Rubber Corp., Trenton, N. J.	28.50	51.75	55.75	59.50	62.50	72.50	75.75	119.70	2000	90	161.10	2700	100	202.50	4000		
Bergougnan Cord, non-skid																	
Braender Rubber & Tire Co., Rutherford, N. J.	25.85	43.45	46.90	49.10	51.55	61.15	64.25	91.65	2200	90	126.50	3000	100	162.95	4000		
Bull-Dog Super Cord, non-skid																	
Brunswick-Balke-Collender Co., Chicago, Ill.	24.50	41.85	44.25	47.30	49.65	58.90	61.90	91.85	2200	90	128.25	3000	100	165.20	4000		
Burdick Tire & Rubber Co., Noblesville, Ind.	24.50	44.00	46.50	49.75	52.15	61.85	63.50	65.00	92.75	2200	90	131.15	3000	100	169.00	4000	
Burdick Cord, non-skid																	
Canton-Blackstone Co., Youngstown, O.	39.50	58.75	62.25	67.25	70.50	80.00	83.00	143.00	2200	90	184.00	3000	100	238.00	4000		
Combination Rubber Mfg. Co., Bloomfield, N. J.	24.50	41.85	44.25	47.30	49.65	58.90	61.90	91.85	2200	90	128.25	3000	100	165.20	4000		
Viking Cord, non-skid																	
Empire Tire & Rubber Co., Trenton, N. J.	24.90	41.85	44.25	47.30	42.65	58.90	61.90	95.45	2200	90	173.95	4000	110	228.00	5000		
Empire Cord, non-skid																	
Erle Tire & Rubber Co., Sandusky, O.	26.15	43.95	46.45	49.65	52.15	61.85	65.00	100.20	2000	90	141.75	2700	100	182.65	3500		
Erle Cord, non-skid																	
Excel Rubber Co., Wadsworth, O.	27.50	46.30	48.95	52.35	54.90	65.20	68.45	105.25	2200	120	120.00	2200	90	170.00	3000		
Flint Cord, non-skid																	
Falls Rubber Co., Cuyahoga Falls, O.	24.50	46.30	48.95	52.35	54.90	65.20	68.45	105.25	2200	120	120.00	2200	90	170.00	3000		
Falls Cord, Neverslip Cord																	
Federal Rubber Co. of Ill., Cudahy, Wis.	26.50	44.50	47.00	50.25	52.75	62.60	64.15	65.75	104.50	2200	90	128.50	3000	100	191.00	4000	
Federal H. D. Cord, Cross Bar Rugged																	
Fireside Tire & Rubber Co., Akron, O.	24.50	46.30	48.95	52.35	54.90	65.20	68.45	96.00	2300	100	127.85	3000	110	164.70	4000		
Firestone Tire & Rubber Co., Akron, O.	24.50	46.30	48.95	52.35	54.90	65.20	66.80	68.45	91.85	2200	90	128.25	3000	100	165.20	4000	
Firestone Cord, non-skid																	
Fisk Rubber Co., Chicopee Falls, Mass.	27.50	46.30	48.95	52.35	54.90	65.20	66.80	68.45	91.85	2200	90	126.50	3000	100	162.95	4000	
Fisk Cord, non-skid																	
Gates Rubber Co., Denver, Colo.	26.50	44.45	47.00	50.30	52.75	62.60	64.90	65.75	102.00	2200	90	127.75	3000	100	164.80	4000	
Gates' Super-Tread Cord																	
General Tire & Rubber Co., Akron, O.	24.50	46.30	48.95	52.35	54.90	65.20	66.80	68.45	91.85	2200	90	117.75	2200	90	162.95	3000	
General Cord, non-skid																	
Gillette Rubber Co., Eau Claire, Wis.	27.50	49.90	51.90	57.30	60.15	71.15	81.60	72.60	88.30	2200	90	128.25	3000	100	209.85	4000	
Gillette Safety Tread Cords																	
Goodrich, B. F., Rubber Co., Akron, O.	24.90	41.85	44.25	47.30	49.65	58.90	61.90	91.85	2200	90	124.95	3000	100	160.95	4000		
Goodrich Cord																	
Goodyear Tire & Rubber Co., Akron, O.	24.50	46.30	48.95	52.35	54.90	65.20	66.80	68.45	91.85	2200	90	128.25	3000	100	165.20	4000	
Goodyear Cord, All Weather																	
Hewitt Rubber Co., Buffalo, N. Y.	24.50	46.30	48.95	52.35	54.90	65.20	66.80	68.45	91.85	2200	100	128.25	3000	110	165.20	4000	
Hewitt Cord, non-skid																	
Hood, Rub. Prod., Inc., Watertown, Mass.	24.50	46.30	48.95	52.35	54.90	65.20	66.80	68.45	91.85	2200	90	128.25	3000	100	165.20	4000	
Hood Cord, non-skid																	
Howe Rubber Corp., Inc., New Brunswick, N. J.	47.05	49.80	53.25	55.85	66.30	69.70	95.00	2000	90	106.40	2000	90	143.20	3000	100	180.00	4000
India Tire & Rubber Co., Akron, O.	27.85	46.80	49.50	52.90	55.50	65.90	67.60	69.25	109.45	2200	90	155.40	3000	100	198.55	4000	
India Cord, non-skid																	
Kelly-Springfield Tire Co., New York, N. Y.	46.00	49.40	53.00	55.40	55.40	65.60	68.00	68.40	120.00	2200	90	154.00	3000	100	184.00	4000	
Kelly-Springfield Cord, B. B.																	
Kokomo Rubber Co., Kokomo, Ind.	46.25	48.95	52.45	54.90	65.25	68.40	71.90	91.85	2200	90	128.25	3000	100	165.20	4000		
Kokomo Cord, non-skid																	
Lee Tire & Rubber Co., New York, N. Y.	24.50	41.85	44.25	47.30	49.65	58.90	61.90	61.95	106.00	1970	90	150.00	2720	100	193.10	3595	
Lee P. P., non-skid																	
McGraw Tire & Rubber Co., Cleveland, O.	29.10	40.50	43.35	54.05	54.05	61.95	61.95	61.95	106.00	1970	90	155.40	3000	100	198.55	4000	
McGraw Cord, non-skid																	
Kelly-Springfield Tire Co., New York, N. Y.	24.90	41.85	44.25	47.30	49.65	58.90	61.90	61.90	88.30	2000	90	143.20	3000	100	180.00	4000	
Kelly-Springfield Cord, B. B.																	
Madison Tire & Rubber Co., New York, N. Y.	30.00	49.10	51.90	55.50	58.20	69.10	72.55	96.85	2000	90	150.00	2720	100	193.10	3595		
Marathon Tire & Rubber Co., Clayhahoga Falls, O.	26.50	41.85	44.25	47.30	49.65	58.90	61.90	61.90	95.50	2200	100	155.40	3000	100	198.55	4000	
Marathon Cord, Angle																	
Mason Tire & Rubber Co., Kent, O.	26.50	41.85	44.25	47.30	49.65	58.90	61.90	61.90	89.30	2200	90	122.65	3000	100	158.00	4000	
Mason Cord, non-skid																	
Michelin Tire Co., Milltown, N. J.	24.50	46.00	48.50	52.60	54.50	65.00	68.00	68.00	95.00	2000	90	128.25	3000	100	165.20	4000	
Michelin Cord																	

THE COMMERCIAL CAR JOURNAL

OCTOBER 15, 1921

The Industry Needs Good Salesmen

(Continued from page 26)

life, and hard study and application will acquaint a layman with a knowledge of truck selling that will make him invaluable.

The new application of vocational selling has increased the importance of salesmen from other walks of life. A sales manager from one of Philadelphia's prominent dealers has evolved a plan for the vocational idea which is meeting with much success. A salesman is queried as to his knowledge of any industry outside of the automobile industry. If, for example, he shows a leaning toward the ice cream business, he is given charge of all prospects and customers in this and allied industries, such as the confectioner, the baker, the flourman, the milk business. Such vocations as the iron and steel business, the coal business, the lumber business, etc., are given to another salesman. This sales manager finds that his man becomes familiar with three or four allied industries, which makes him of great value in advising and analyzing prospects.

The disadvantages of this system are very pronounced in a large city. A salesman in this system in New York City might be at Battery Park in the morning, Yonkers at noon, and Columbus Circle in the evening. Manufacturers in a large city are too widely scattered to permit a salesman to make many calls during a day.

The sectional system seems the best, then, for a large metropolis. One distributor seems to have overcome the difficulty by a sort of combination vocational-sectional system. The city is divided into territories and a salesman assigned to each one. If in any particular territory there is a big concern using an enormous fleet of trucks, the big concern is handled by a special salesman, the dealer's best one, who makes his weekly calls. This salesman has all the largest users, and as the number is usually small, he is able to cover all the prospects effectively. The ordinary territory salesman might not be able to see the big user in his territory more than once a month.

The scarcity of salesmen need evoke no alarm. The condition should be righted by spring. The situation does teach us some very important facts.

The dealer must give more attention to his salesmen. They must be continually filled with enthusiasm and pre-war pep. They must be stimulated with good bonus systems and made to feel that hard work, mixed with the right application of brains, is appreciated, even though great results are not forthcoming at the present moment.

Greater care must be taken in the selection of salesmen. The floater and money grabber must be kept out.

money grabber must be kept out. Infinite pains must be taken in the training of green salesmen. Now is the best time for salesmanship training, as buyers are few and many owners are "shopping."

The success of the present situation will depend on the salesman. With the aid of his hard work, business will blossom in 1922.

Taken From Current House Organs

The "Turn Over" in Knowledge

Every production of genius, whether book, picture, machine or liquid—is composed of ordinary materials!

Machines are nothing but combinations of metals. Put them together in one way and you get a make-shift; combine them with genius (remember Whistler's remark about "paint mixed with brains?") and you get a marvel such as the locomotive, the automatic lathe, the wireless.

Always and always, the materials are the ordinary things about us. The extraordinary thing about radium wasn't radium that has been in existence for eternity. The isolating of the substance and the use of it were the great things.

Which brings me to my point—"turn over" as a law of success applies to the mind as well as to other merchandise. Your brain is a store house with the emphasis on the store. From it, you disburse merchandise in the way of thoughts, feelings and actions.

Pack it as much as you like, learn all sorts of things, and if you do not distribute, turn over, sell or otherwise make useful and effective that store of learning you are an educated fool and nothing else. The test of a man is never what you know. The test is what do you make useful and effective of what you know!

A man who knows ten things and uses them all the time is more useful to himself and his fellow men than the man who knows a hundred things and never makes use of one! The first man, at least knows the secret of turn over. Idle knowledge is like idle machinery and idle men—wasted. Take the things you know, combine them with the ordinary materials about you and go to work.—*Helix*, Greenfield Tap & Die Corp., Greenfield, Mass.

More Money Spent on Rural Roads

During the calendar year 1919, forty-six states expended over \$500,000,000 on their rural roads and bridges, the Bureau of Public Roads of the U. S. Department of Agriculture recently announced. This total is made up of the actual cash expenditures for such items as labor, materials, supervision, and administration, amounting to \$389,455,931, and convict labor and statute labor, the value of which, not definitely known, is estimated at about \$132,000,000.

The road and bridge expenditures for 1919 show an increase of approximately 33 1-3 per cent over those in 1914. More striking, however, is the increase in the proportion of the total funds supervised by the several State Highway Departments. In 1918 the expenditures by or under the supervision of the State Highway Departments amounted to \$117,285,268, while the local funds, over which they exercised no control whatever, amounted to \$168,812,925. In 1919, however, the

State Highway Departments supervised the expenditure of \$200,292,694 as against the total of \$189,163,237 expended by the local road and bridge authorities.—*Highway Magazine*, American Rolling Mill Co., Middletown, O.

Rose-Colored Spectacles

Many a salesman saw his market through rose-colored glasses in the first riotous year after the Treaty of Versailles.

It made a pretty and comforting picture. Buyers clamoring for his goods; two sales where one ordinarily grew. What need for sales arguments? What necessity to spend money on advertising?

Good salesmen have long since discarded their rosy spectacles. Salesmanship is back in the saddle.

The leaders in all lines are getting their names and their products back into the magazines and newspapers. But gone is the short hour of the flowery, generalizing advertisement. Real facts and sound ideas—selling arguments—are the advertising order of the day.

Slowly but surely the man on the road is relearning a lesson he had almost forgotten—not to be discouraged by a buyer's first "No." And in this, advertising is one of the ways the manufacturer and the sales manager are driving the lesson home.—*Critchfield's Commentary*, Critchfield & Co., Chicago, Ill.

The Fable of the Ouija Board

Once upon a time, even before the cost of trousers and boots had aviated, there were two salesmen who proffered the same commodity to the same willing or otherwise prospective purchasers.

Now each of these salesmen had a system. And like all followers of things systematic, each believed his brand would put it across big. But one salesman overlooked the slight detail of picking the right system.

For when the adding machines had totaled the results, the discerning sales manager perceived from the added sums that one salesman had been highly successful and one has been highly vice-versa.

Whereupon the D. S. M. was behooved to ascertain why the one salesman was so much and the other was so little. So the D. S. M. donned his gum shoes and tracked a ouija board to its lair and choked the secret from the O. B. in spirit language as follows: i. e., to wit—"One salesman, he who is successful, wears out one pair of trousers to two pairs of boots while the salesman, he who ain't, wears out two pairs of trousers to one pair of boots."

Thereupon the D. S. M. evolved this moral. One boot occasionally applied to the seat of the trousers of some salesmen accelerates the spirits of activity.—*Acme Angles*, Acme Motor Truck Co., Cadillac, Mich.

Don't be a "Floppenwash"

Don't be a "Floppenwash"—you probably won't be able to find that word in Mr. Webster's dictionary. I'll tell you that now and save you the bother of looking it up.

Well, anyway my definition of a "Floppenwash" is a man who has a family of kiddies and who is so far away from their ideas and ideals as to cause the youngsters to hide behind mother's skirts when he comes home at night.

In my day I have seen many species of "Floppenwashes" but the worst one of all is the one who allows his youngsters to grow-up fearing him instead of being their pal and buddy.

The real human being who is the direct antithesis of a "Floppenwash" is the Dad whose greatest joy in life is when the day's work is done comes home and casts off the artificial convention of dignity—sans coat and collar—and with joy unconfined enters into the joy of living—the joy of a romp with the kids.

Ask yourself these questions? When you come home from your business are you met at the gate or at the top of the stairs by a toddling bunch of innocence? Do you pick up a pink cooing baby or take it from the sheltering arms of a tired mother and toss it high and then hold it close to your breast and bite its fat, chubby hands? Do you?

If you don't you are a "Floppenwash" and need to be examined for what ails you and besides you as a father and a teacher are missing the greatest happiness in life.

Don't get the idea that because you are a business success that you must carry your put-on stiff necked dignity into your home—by so doing you are only fooling yourself and missing the joy that only comes to a man when he becomes a real honest-to-goodness pal and Dad.

Loosen up—get down on your hands and knees, put Bill on your back and Bob at your head and be a bucking broncho, toss the kid high and make him like it and when you do that those little lives will entwine themselves into your life and you will grow up with them.

If by any chance you are a "Floppenwash" or bordering on one shake it before it is too late and tonight when you get home don't sneak off to a quiet corner to read your paper and leave instructions with mother that the kids are not to bother you. Don't do it! But instead, get a half-Nelson on one of them, roll on the floor, muss up things—make a fool of yourself—a regular boy—not only for their sake but the sake of their mother.

Will they like it? I'll say they will, and besides they will remember those romps all their lives and for once you will be close to the greatest thing in life—the love of your youngsters.

If you will follow this idea you will never be sorry and in the doing you will know what one man thinks—and did.—*Truck Transportation*, Selden Truck Corp., Rochester, N. Y.

The technical knowledge that comes to you from **SKF** engineers is



as it is the sum of the data gathered by **SKF** organizations in all industrial countries.

This fund of engineering information we bring to the fabrication of all products bearing the mark **SKF** and the operation of those industries which we are requested to supervise. In order that complete reliance may be placed in the endorsement expressed by the mark **SKF** it is necessary not alone that we control and supervise each step in the manufacture of a product but also its final installation.

Because every effort is made to assure the most satisfactory use of products marked **SKF** we welcome requests for information concerning their proper application and maintenance.

Automotive engineers and manufacturers should feel that this technical knowledge is always available. You are urged to use it freely without any sense of obligation.

SKF Industries, Inc.
165 Broadway, New York City

*Supervising
at the request
of the stock-
holders.* { The Hess-Bright Manufacturing Co.
The Skayef Ball Bearing Co.
Atlas Ball Co.
Hubbard Machine Co.
SKF Research Laboratory

American Malleable Castings Association's Research Program Bears Fruit

By RALPH S. GILDART

ABULETIN, covering the result of the tensile test of bars sent daily from each plant, has just been issued from the office of Enrique Touceda, Albany, N. Y., consulting engineer for The American Malleable Castings Association. The bulletin throws an interesting light on the results of consistent research work covering a period of years, the value of which has been particularly demonstrated during the past three or four years.

Those who have kept in touch with the commendable work fostered by The American Malleable Castings Association in the improvement of malleable castings will recall the unhealthy condition in which the malleable industry found itself some seven or eight years ago. Except in a few cases, there was at that time no such thing as individual uniformity either in manufacturing methods or of the resultant product of different malleable foundries.

Malleable castings as at present manufactured, in conformity to Association standards instead of being of uncertain quality and lacking in uniformity, are of the highest quality and integrity. The most marked advance in development has been made in the past three and one-half years, during which period the product of Association members as a whole has increased from an average somewhat under 49,000 lb. per sq. in. ultimate tensile strength to over 53,000 lb., and from an average elongation under 10 per cent in two inches to nearly 16 per cent.

The bulletin referred to in the opening paragraph covers the report of bars tested by the consulting engineer for the month of June, 1921, when the highest average percentage of elongation of the Association as a whole was attained, namely 15.77 per cent in two inches, or over twice the elongation required by the American Society for Testing Materials in its standard specification for malleable cast iron.

Since elongation, which is the measure of ductility, is the property on which malleability depends, it will be seen that this report marks a new high level in the research program. Since the first of the year, the rise in percentage of elongation has been steady and uninterrupted, and has increased a full two per cent.

The high water mark for average ultimate tensile strength was reached in April of this year when the figure of 53,530 lb. per sq. in. was recorded. The June value for this property was 53,038 lb. per sq. in. This value is in excess of the A. S. T. M. requirement by slightly over 8000 lb.

A reference to the accompanying chart showing average ultimate tensile strength and elongation for the product of the membership as a whole, for 1918, 1919, 1920 and the first six months of 1921, indicates clearly how these two properties have increased during this interval. The average of both properties has always been well in excess of the A. S. T. M. standard requirements of 45,000 lb. per sq. in. tensile strength and 7½ per cent elongation in two inches. It is clear that this margin, when added to the factor of safety already included in the standard specifications, offers exceptional safeguards to the user of those malleable castings furnished by a majority of the members of the Association.

The study of this chart shows a gradual increase in both tensile strength and elongation, with but occasional slight retrogression to values never reached before. It will be noted that the two curves run fairly parallel, rising and falling together, a characteristic of malleable iron which is rather unusual for ferrous materials, the reverse normally being true.

The constancy in the average values of these properties is readily accounted for by the fact that new plants were added to the list of test bar contributors. None of these had previously profited by the research work, and their submitted test bars in most cases had the effect of low-

ering the general average of the Association, until after such time as the effect of the new influence began to assert itself. Improvement in quality of the new contributors through the assistance of the consulting engineer, however, had the effect of a steady and rapid increase in both physical properties. The slight retrogression in the average values of both properties marked by the dropping of the curves from August to November of 1920, is explained as having been due to the serious handicap experienced by the foundries in getting good pig iron and coal during that exceptional period of demand for all commodities.

The bulletin reveals that a high percentage is maintained in the quality of membership product. Standard specification requires 45,000 lb. tensile strength or 7½ per cent elongation in two inches. June, 1921 shows 87% efficiency.

This general improvement of the product of all members is reflected in the number of certificates that were awarded by the consulting engineer for the quarter ending June 30th; sixty-one plants, having been awarded the coveted certificates, the highest number yet issued for any one quarter. The awarding of a certificate is not based upon the test bar record alone; the general plant practice as reported by the consulting engineer's corps of inspectors being considered in its effect upon the product. Through this safeguard the purchaser is assured that the test bar record of each day's production can be considered as truly representative of the casting. Castings furnished by certificate-holding plants are designed as "certified".

Nothing could more clearly indicate the value of a research program consistently carried out and rigidly applied than a comparison of this most recent report with those that have preceded it. The net result of this work has been to raise to a high level the standards of a great industry, and to increase materially the commercial applications of its product.

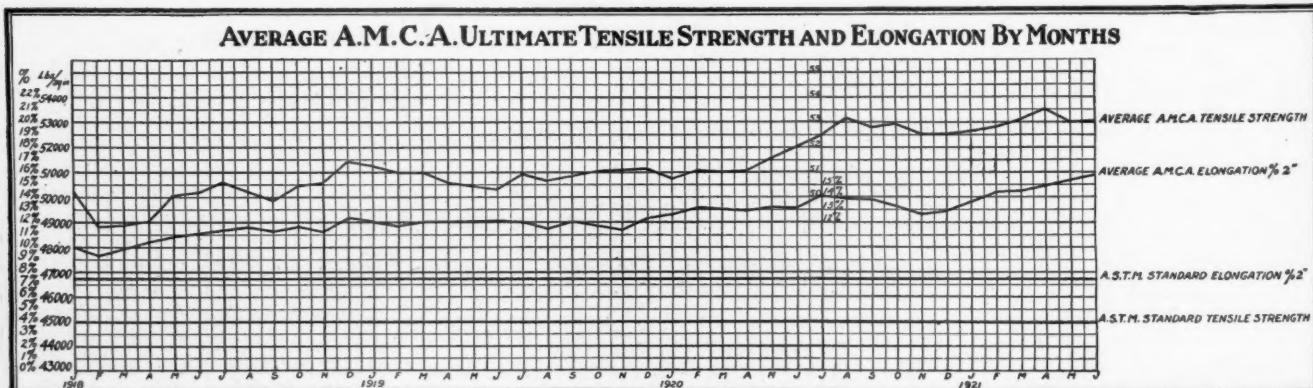


Chart Showing Tensile Strength and Elongation Increase of A. M. C. A. Malleable Castings for 1918, 1919, 1920 and Half of 1921

THE COMMERCIAL CAR JOURNAL

Entered as second-class matter at the Post Office at Philadelphia, Pa., under the act of March 3, 1879

Vol. XXII] PHILADELPHIA, NOV. 15, 1921 No. 3

Published the 15th of each month by the

CHILTON COMPANY

Market and 49th Streets Philadelphia, U. S. A.

JAMES ARTMAN, President C. A. MUSSelman, Treas. & Gen'l Mgr.
GEO. H. BUZBY, Vice President A. H. VAUX, Secretary

ADVERTISING DEPARTMENT

C. MONROE SMITH, Eastern Manager GEORGE H. DUCK, Western Manager
GEORGE D. ROBERTS, Advertising Director Chilton Publications
A. W. BROWNELL, Advertising Manager

L. E. McCONNELL, Jr., New York E. H. CROLL, New York
F. W. HENKEL, Chicago
J. C. WEED, Detroit E. W. CORMAN, Cleveland

EDITORIAL DEPARTMENT

JAMES ARTMAN, Editor in Chief ALBERT G. METZ, Managing Editor
MARTIN J. KOITZSCH, Associate Editor

EDITORIAL REPRESENTATIVES

C. P. SHATTUCK, Field Editor A. V. COMINGS, Western
CHESTER S. RICKER, Technical

TABLE OF CONTENTS

	PAGE
Advertisers' Index.....	190
Buyers' Index of Reading and Advertising Pages.....	186
Commercial Car Specifications.....	55
Editorials.....	21
Equipment and Appliances.....	33
Metal and Rubber Markets.....	67
New Commercial Cars.....	26
News of the Trade, Including Personals, New Agencies, Factory Items, Etc.....	23
Pneumatic Tire Prices.....	68
Replacement Table.....	49
Service Station and Repair Shop Appliances.....	44
Taken From Current House Organs.....	70

SPECIAL ARTICLES

What is the Matter With the Motor Truck Industry?	11
Some Pointers on Servicing Speed Trucks.....	13
How to Take the Kick Out of the Kicker.....	16
Make the Draining of Crankcase Oil a Simple Operation.....	19
Quality, Simplicity and Standard Magneto Base, Features the Paquito Unit Battery Ignition System.	39
Are You Merchandising Your Service?	42
Avoid Inspection; Avoid Profit!	66
Truck Drivers Blaze Way for Owners of Passenger Cars.....	71
Latest Trolley Bus Development.....	74
Trailers Reduce Transportation Costs in Fruit Handling.....	76
New Developments in Road Construction Methods Anticipated as Results of California Tests.....	77

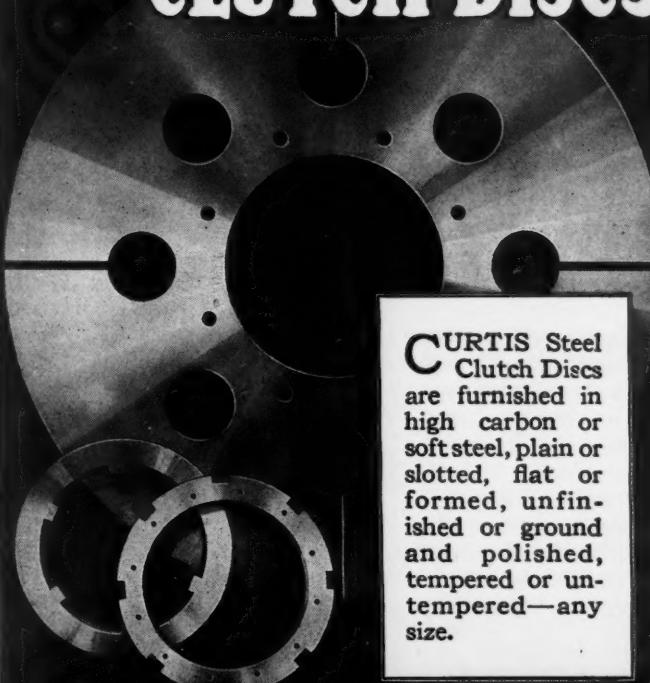
SUBSCRIPTION RATES

United States and Possessions	\$2.00
Canada	3.00
Foreign	4.00
Single Copies	40c

Make Checks, Money Orders, etc., payable to Chilton Company
Change of Address—Subscribers desiring their address changed should give the old as well as the new

The Commercial Car Journal is a member of the Audit Bureau of Circulations, the Recognized Authority on Circulation Audits

CURTIS CLUTCH DISCS



CURTIS Steel Clutch Discs are furnished in high carbon or soft steel, plain or slotted, flat or formed, unfinished or ground and polished, tempered or untempered—any size.

We are experts in the manufacture of custom-built clutch discs of precision. We know exactly what is necessary to satisfactory performance in automobile, truck or tractor service.

By concentrated effort and intensive skill we have over a period of years developed the clutch disc business to a plane not approached by any other manufacturer.

We have solved many perplexing problems. We are in a position to give expert advice as to your particular needs.

Curtis Clutch Disc Co.

1507 Kienlen Ave. St. Louis, Mo.

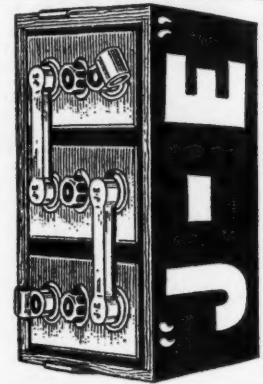


REG. TRADE-MARK

"J-E"

STORAGE STARTING and LIGHTING BATTERY

YEARS



WITHOUT WATER

WITHOUT REPAIRS

WITHOUT ATTENTION

CANNOT SPILL OR SPLASH

EXPENSE: UPKEEP OF LIQUID BATTERIES

3 Battery Men to care for 300 trucks, at \$40 a week each.....\$6,240 a year

300 Batteries repaired 4 times a year, at \$2.50 for parts, each repair.. 3,000

Yearly cost of maintenance and repairs.....\$ 9,240

Total cost for 18 months..... 13,860

"J-E" Battery is UNCONDITIONALLY GUARANTEED for 18 months

Requires no care or attention, saving the yearly cost of at least 2 men, or... \$4,160

Eliminates Repair Bills, saving..... 3,000

Showing a total saving for the year..... \$7,160

Eliminating, during 18 months, an expense of..... \$10,740

on 300 Batteries, or \$35.80 per battery, and the "J-E" Battery is guaranteed to retain its full rated capacity at the end of 18 months.

CAN BE LEFT IDLE FOR MONTHS WITHOUT HARM
OR DETERIORATION AND IT WON'T RUN DOWN

Jelly-Electrolyte Battery Co., Inc.

Executive Offices: Knickerbocker Building, 152 West 42nd Street, New York City

DISTRIBUTORS,
"J-E" BATTERY
COMPANIES:

{ For the Pacific Coast: 943 Post Street, San Francisco, California
For the Mid-West: 108 West 3rd Street, Oklahoma City, Oklahoma
For the Southern States: 15th Street and Broadway, Nashville, Tenn.

Recharged in same manner as other
lead-plate batteries

Factory:
1113 SOUTH BROAD STREET
PHILADELPHIA, PA.

"We are pleased to advise that we have tested this battery from May, 1920, to the present date. At first we made a purchase of 6 batteries, to see if they would stand the service on the solid-tire motor vehicles, carried on the running board, and since that test we have placed 150 of them into service, and up to the present writing we have had no trouble with the positive and negative groups or with the jars and separators.

"Before we came across this style of battery, we had to repair the batteries every three months. Since the use of the "J-E" Battery we are able to dispose of two of our battery builders, and even now we are unable to keep one man fully employed on the battery work. We are going to equip our entire fleet of 200 or 300 vehicles with this style of battery, as it lowers the maintenance cost.

"We are fully convinced that this unit is far superior to the acid battery that we have used, and we have used all the prominent makes and many makes that are not listed in the market.

"We find that this battery does not sulphate, it does not freeze and the acid does not eat the covering off the wires. It does not make any difference if the battery is laid on its side or if it stands upright."